Vol. 988 Number 1

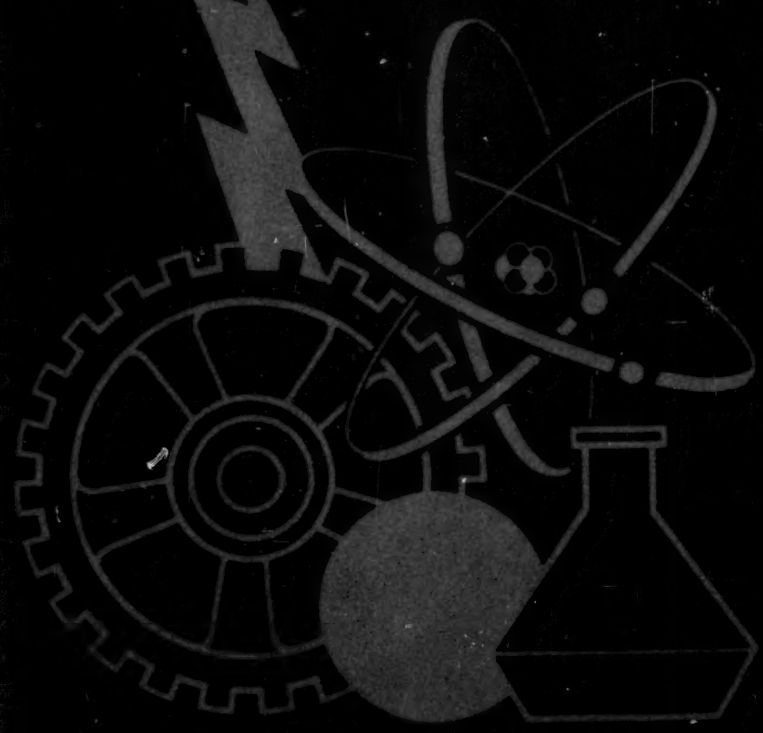
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 6, 1979



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 6, 1979 Volume 988 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT, including the amounts of the fees thereunder and the States that may be designated in international applications, consult the notice entitled "Update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 3, 1979.

Effective August 1, 1979 the international fees are increased to the following amounts:

Basic fee under PCT Rule 15.1(i) for an international application containing 30 sheets or less	$190.00
Supplemental fee to the Basic fee for each page of an international application in excess of 30 sheets	3.50
Designation fee under PCT Rule 15.1(ii)	45.00

July 3, 1979.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Execution and Filing of Patent Applications

This notice is intended as a reminder that United States patent applications which have not been prepared and executed in accordance with the requirements of Title 35 of the United States Code and Title 37 of the Code of Federal Regulations may be denied a filing date as a complete application or may be, in appropriate circumstances, stricken from the files as having been improperly executed and/or filed. Although the statute and the rules have been in existence for many years, the Office continues to receive a number of applications which have been improperly executed and/or filed. Since the improper execution and/or filing of patent applications can ultimately result in a loss of rights it is appropriate to re-emphasize the importance of proper execution and filing.

Attention is invited to the fact that 35 U.S.C. 111 requires that "(t)he application must be signed by the applicant . . ." The same requirement appears in 37 CFR 1.57 which specifies that the signature to the oath or declaration "will be accepted as the signature to the application provided the oath or declaration . . . is attached to and refers to the specification and claims to which it applies. Otherwise the signature must appear at the end of the specification after the claims."

It should be carefully noted that the application "signed by the applicant" must be a *complete* application and cannot be simply an oath or declaration signed without the remainder of the application. As an example, it is improper for an applicant to sign an oath or declaration which is later attached to a specification and/or claims unless the specification is also signed after the claims. See 37 CFR 1.56(c) which provides that "(a)ny application may be stricken from the files if: (1) Signed or sworn to in blank, or without actual inspection by the applicant . . ."

The provisions of 35 U.S.C. 363 for filing an international application under the Patent Cooperation Treaty (PCT) which designates the United States and thereby has the effect of a regularly filed United States national application, except as provided in 35 U.S.C. 102(e), are somewhat different than the provisions of 35 U.S.C. 111. Under 35 U.S.C. 363 and PCT Article 11(1), the signature of the inventor is not required to obtain a filing date but must be submitted later. The oath or declaration requirements for an international application before the Patent and Trademark Office are set forth in 37 CFR 1.70.

The requirement that applicant sign "the application" also precludes alterations to the application after execution. See 37 CFR 1.52(c) which states that "(n)o . . . alterations are permissible after execution of the application papers." It is therefore necessary that the application, including the oath or declaration, be executed in the form in which it is intended to be filed since it is improper for anyone, including counsel, to complete or otherwise alter application papers, including the oath or declaration, after the applicant has executed the same. Section 1.56(c) provides that "(a)ny application may be stricken from the files if: . . . (2) Altered or partly filled in after being signed or sworn to."

In summary, it is emphasized that the application filed must be the application executed by the applicant and it is improper for anyone, including counsel, to alter, rewrite, or partly fill in any part of the application, including the oath or declaration, after execution by the applicant. This reminder should particularly be brought to the attention of foreign applicants by their United States counsel since the United States law and practice in this area may differ from that in other countries. Hopefully, this Notice will serve as an adequate reminder so that applicants will not lose rights through the improper execution and/or filing of patent applications.

Oct. 11, 1979.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Patent Suits

Notices under 35 U.S.C. 290: Patent Act of 1952

2,968,490, Gichner Mobile Systems, Inc., DEMOUNTABLE RUNNING GEAR; **3,339,766,** same, PALLET LIFTING AND TRANSPORTING DEVICE; **3,378,276,** same, HYDRAULICALLY OPERATED DEMOUNTABLE RUNNING GEAR WITH DIAGONAL RAMS; **3,521,898,** same, DEMOUNTABLE RUNNING GEAR WITH AIR BAG AND TORSION ARM SUSPENSION, **filed** June 5, 1979, U.S. Court of Claims (Washington, D.C.), Doc. 246–79, *The Union Corporation* v. *The United States.*

3,032,510, Tornqvist and Langer, Jr., POLYMERIZATION CATALYST; **3,128,252,** Tornqvist, Seelbach and Langer, Jr., PREPARATION OF PARTIALLY REDUCED TRANSITION METAL HALIDE CATALYST COMPOSITIONS; **3,252,960,** Tornqvist, Seelbach and Langer, Jr., POLYMERIZATION PROCESS AND PRODUCTS THEREOF; **3,814,743,** Tornqvist and Langer, Jr., PROCESS FOR POLYMERIZING ALPHA-OLEFINS, **filed** Mar. 23, 1976, D.C. Del. (Wilmington), Doc. 76–116, *Amoco Chemicals Corporation* v. *Exxon Research & Engineering Co.* Consent order of dismissal with prejudice filed Aug. 16, 1979.

3,055,988, Shure Brothers, Inc., MAGNETIC PHONOGRAPH PICKUP; **3,077,521,** same, STEREOPHONIC MOVING MAGNET PHONOGRAPH PICKUP; **3,077,522,** same, STEREOPHONIC PICKUP CARTRIDGE, **filed** May 13, 1976, D.C. Md. (Baltimore), Doc. HM 76–722, *Shure Brothers, Inc.* v. *Peeltone, Incorporated.* Consent judgment filed Dec. 5, 1978.

3,071,118, James K. Wilden, ACTUATOR VALVE MEANS, **filed** July 1, 1976, D.C., N.D. Calif. (San Francisco), Doc. C76–0030–SW, *Wilden Pump & Engineering Co.* v. *Pressed & Welded Products Co.* Supplemental judgment filed Aug. 23, 1979.

3,071,856, Gillette Company, RAZOR BLADE AND METHOD OF MAKING SAME; **3,518,110,** same, **filed** Nov. 4, 1976, D.C. Del. (Wilmington), Doc. 76–375, *Societe Bic, S.A. et al.* v. *Gillette Company.* Stipulation and order dismissing action with prejudice filed Dec. 4, 1978.

3,077,521. (See 3,055,988.)

3,077,522. (See 3,055,988.)

3,128,252. (See 3,032,510.)

3,165,544, Stauffer Chemical Company, CHLOROTHIOLFORMATES AND PREPARATION THEREOF; **3,299,114,** same, PROCESS FOR MAKING CHLOROFORMATES WITH AMINES AS CATALYSTS, **filed** May 30, 1979, D.C., S.D. Tex. (Galveston), Doc. G–79–106, *Stauffer Chemical Company* v. *Hu-Mar Chemicals, Inc.*

3,188,941, Francis B. Fishburne, ELECTRICAL MEANS FOR CONTROLLING HYDRAULIC PRESSES; **3,595,282,** Fishburne and Hinnant, APPARATUS FOR COMPRESSING LOOSE MATERIAL INTO CONTAINERS; **3,817,298,** Francis

B. Fishburne, VERTICAL PRESS APPARATUS WITH REMOTELY CONTROLLED DISTRIBUTOR, **filed** Oct. 29, 1976, D.C., W.D.N.C. (Asheville), Doc. A–C–76–179, *Fishburne Equipment Co., Inc. and Francis B. Fishburne* v. *Lee Machine-Hydraulic, Inc. and Charles V. Lee.* Judgment filed Nov. 6, 1978.

3,214,510, Robert W. Harmon, CORONA REDUCTION IN CONDUCTOR CLAMPS FOR HIGH VOLTAGE TRANSMISSION LINES, **filed** May 11, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1681, *Bunker Ramo Corp.* v. *Western Electric Company, Inc.* Transferred to D.C., S.D.N.Y. on Mar. 23, 1979.

3,252,960. (See 3,032,510.)

3,260,340, International Business Machines Corporation, REVISION SYSTEM FOR DATA RECORDING AND PRINTING APPARATUS; **3,297,124,** same, DATA RECORDING AND PRINTING APPARATUS CAPABLE OF RESPONDING TO CHANGED FORMAT; **3,490,004,** same, DATA PROCESSING AND PRINTING APPARATUS; **3,512,137,** same, CORRELATED RECORDING, REPRODUCING, PRINTING, AND COMPOSING APPARATUS; **3,630,336,** same, PROPORTIONAL SPACING PRINTER INCORPORATING WORD UNDERSCORE CONTROL; **3,764,994,** same, SERIAL PRINTER WITH BI-DIRECTIONAL DRIVE CONTROL; **3,991,405,** same, MARGIN ADJUSTING OF TEXTURAL CODES IN A MEMORY, **filed** Feb. 23, 1978, D.C., N.D. Tex. (Dallas), Doc. CA3–78–0210–C, *International Business Machines Corporation* v. *Xerox Corporation.* Cause dismissed with prejudice on Aug. 1, 1978.

3,261,526, Fastener Corporation, FASTENER DRIVING APPARATUS; **3,563,438,** same, FASTENER DRIVING TOOL, **filed** Nov. 22, 1978, D.C., E.D. Wis. (Milwaukee), Doc. 78–748, *Duo-Fast Corporation* v. *Aerosmith, Ltd. et al.*

3,297,124. (See 3,260,340.)

3,299,114. (See 3,165,544.)

3,339,766. (See 2,968,490.)

3,340,821, Erich Wesener, TRANSPORTATION SYSTEM, **filed** July 23, 1979, D.C., N.D. Ill. (Chicago), Doc. 79c3038, *Siemens Aktiengesellschaft* v. *Burno Patent et al.*

3,365,762, The Cavins Co. WELL PIPE GRIPPING STRUCTURE, **filed** Aug. 2, 1979, D.C., W.D. Pa. (Shreveport), Doc. 791086, *Dawson Enterprises, doing business as The Cavins Co.* v. *Oilfield Die Manufacturing, Inc. et al.*

3,378,276. (See 2,968,490.)

3,414,254, Norfin, Inc., SHEET COLLATING DEVICE, **filed** Aug. 21, 1978, D.C. Colo. (Denver), Doc. 78–F–857, *Norfin, Inc.* v. *International Business Machines Corporation.* Stipulation and order of dismissal without prejudice filed July 5, 1979.

3,415,129, General Instrument Corporation, DUAL BAND PUSH-BUTTON TUNER; **3,463,017,** same, **filed** Mar. 18, 1977, D.C., E.D. La. (New Orleans), Doc. 77–852, *General Instrument Corporation* v. *Edward Conrad, doing business as Conrad Enterprises.*

3,420,001, Raymond T. Raymon, ADJUSTABLE CLOSURE LOCK, **filed** Aug. 31, 1979, D.C., E.D. Mich. (Detroit), Doc. 79–73417, *M-P Corporation* v. *Haupert & Parson Supply Co., Inc.*

3,463,017. (See 3,415,129.)

3,490,004. (See 3,260,340.)

3,491,500, Billy K. Watkins, POWER STOPPER WEIGHT TRANSFER APPARATUS, **filed** Aug. 22, 1979, D.C. Ind. (Evansville), Doc. EV 79–141–C, *Billy K. Watkins* v. *Plainville Lions Club and Marvin Jolliff.* **Same, filed** Aug. 23, 1979, D.C., W.D. Tenn. (Jackson), Doc. 79–1113, *Billy K. Watkins* v. *Robin Wood and Robin Wood Sled Rental.* **Same, filed** Aug. 24, 1979, D.C., M.D. Tenn. (Nashville), Doc. 79–1029, *Billy K. Watkins* v. *Unionville Sled Association et al.* **Same, filed** Aug. 24, 1979, D.C., W.D. Mo. (Kansas City), Doc. 79–6053–CV–SJ, *Billy K. Watkins* v. *Dave Hager.* **Same, filed** Aug. 31, 1979, D.C., E.D. Tenn. (Greenville), Doc. C–4–79–35, *Billy K. Watkins* v. *Eddie Fletcher.*

3,512,137. (See 3,260,340.)

3,518,110. (See 3,071,856.)

3,521,898. (See 2,968,490.)

3,552,469, B & J Manufacturing Co., TIRE BEAD SEATER; **3,675,705,** same, TIRE BEAD SEATING AND INFLATION APPARATUS, **filed** Aug. 29, 1979, D.C., E.D. Mich. (Detroit), Doc. 79–73373, *B & J Manufacturing Co.* v. *Brown-Hutchinson, Inc. and Anthony C. Fortunski.*

3,563,438. (See 3,261,526.)

3,577,241, American Beef Packers, Inc., METHOD OF PREPARING EDIBLE ANIMAL FEET, **filed** Dec. 15, 1978, D.C. Nebr. (Omaha), Doc. CV 78–0–547, *American Beef Packers, Inc.* v. *Palamera Beef Corp.* Joint stipulation for dismissal filed Aug. 31, 1979.

3,595,282. (See 3,188,941.)

3,630,336. (See 3,260,340.)

3,675,705. (See 3,552,469.)

3,699,815, Medical Development Corporation, IMPROVEMENTS IN BODY FLUID COLLECTION BOTTLE; **3,811,485,** same, VALVE AND RELATED STRUCTURE FOR VACUUM OPERATED LIQUID-FILL BOTTLES; **Re. 29,321,** same, FLUID COLLECTION BOTTLE AND IMPROVEMENTS THEREIN, **filed** Nov. 13, 1978, D.C., N.D. Tex. (Dallas), Doc. CA3–78–1392–C *Medi-Vac Corporation* v. *Medical Development Corporation.*

3,756,139, John Wolens, POPCORN POPPER, **filed** Aug. 30, 1979, D.C., N.D. Ill. (Chicago), Doc. 79c3576, *John Wolens* v. *K-Mart Corporation et al.*

3,764,994. (See 3,260,340.)

3,774,693, Orthman Manufacturing Company, AGRICULTURAL IMPLEMENT; **3,941,194,** same, FOLDING TOOL BAR HAVING A TRANSPORT BRACE, **filed** Aug. 14, 1979, D.C., C.D. Ill. (Rock Island), Doc. 79–4043, *Orthman Manufacturing Company* v. *Chromalloy American Corporation.*

3,780,991, Whitlock, Inc., PROPORTIONING HOPPER FOR GRANULAR MATERIALS, **filed** Aug. 30, 1979, D.C., N.D. Ga. (Atlanta), Doc. C79–1628A, *Whitlock, Inc.* v. *Process Control Corporation.*

3,785,273, Daniel T. Stickle, TACO SHELL MACHINE; **3,880,065,** same, TORTILLA CENTERING DEVICE; **3,928,688,** same, METHOD OF MAKING TACO SHELLS; **4,154,153,** same, DRIVE MECHANISM FOR A MECHANIZED TACO SHELL FRYER, **filed** May 16, 1979, D.C., W.D. Wis. (Madison), Doc. 79–C–213, *H. M. Stickle et al.* v. *Heublein Inc.*

3,811,485. (See 3,699,815.)

3,814,743. (See 3,032,510.)

3,817,298. (See 3,188,941.)

3,826,068, George C. Ballas, ROTARY CUTTING ASSEMBLY; **3,859,776,** Weed Eaters, Inc., same; **4,035,912,** Weed Eaters, Inc., same, **filed** June 1, 1979, D.C., S.D. Tex. (Houston), Doc. CAH–79–1128, *Black & Decker, Inc.* v. *Weed Eater, Inc.*

3,830,526, Hydrotech International, Inc., APPARATUS AND METHOD FOR MAKING SUB-SEA CONNECTIONS, **filed** Mar. 2, 1979, D.C., S.D. Tex. (Houston), Doc. H–79–401, *Hydrotech International, Inc.* v. *Gripper Inc. and Luther L. Manchester Jr.*

3,852,201, Jack M. Jackson, A CLAY FREE AQUEOUS DRILLING FLUID; **3,953,335,** same, MAGNESIA STABILIZED ADDITIVES FOR NON-CLAY WELLBORE FLUIDS, **filed** Apr. 5, 1979, D.C., S.D. Tex. (Houston), Doc. H–79–684, *Brinadd Company* v. *Texas Brine Corporation.*

3,859,594, Rosemount, Inc., TWO WIRE CURRENT TRANSMITTER RESPONSIVE TO A RESISTANCE SENSOR INPUT SIGNAL; **4,016,763,** same, TWO WIRE CURRENT TRANSMITTER RESPONSIVE TO A RESISTIVE TEMPERATURE SENSOR INPUT SIGNAL, **filed** June 3, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1998, *Rosemount, Inc.* v. *Honeywell Inc.*

3,859,776. (See 3,826,068.)

3,880,065. (See 3,785,273.)

3,893,890, National Starch and Chemical Corp., PROCESS FOR INHIBITING THE ACTION OF PEPSIN, **filed** Feb. 4, 1977, D.C. Del. (Wilmington), Doc. 77–43, *Rohm and Haas Co. and Peter L. Debenneville* v. *National Starch and Chemical Corp.*

3,923,372, Max Roland, FIBER OPTIC EXTRA ORAL OPERATORY LIGHT, **filed** Aug. 28, 1979, D.C., N.D.N.Y. (Utica), Doc. 79–CV–571, *MDT Instrument Company* v. *Welch Allyn, Inc.*

3,929,051, Chicago Musical Instrument Co., MULTIPLEX HARMONY GENERATOR, **filed** June 23, 1978, D.C., N.D.

Ill. (Chicago), Doc. 78c2534, *Norlin Industries Inc.* v. *Conn Organ Corporation.* **Same, filed** June 30, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c2620, *Norlin Industries, Inc.* v. *The Wurlitzer Company.*

3,935,443, Allen P. Simmons, ILLUMINATED ANIMAL COLLAR AND LEASH, **filed** Aug. 17, 1979, D.C., S.D. Fla. (Fort Lauderdale), Doc. 79–6472–CIV–NCR, *Allen P. Simmons* v. *Hilliard A. Haas, Jr. et al.*

3,940,606, Starlight Associates, HIGH INTENSITY SPOTLIGHT, **filed** Sept. 13, 1977, D.C., S.D.N.Y., Doc. 77–4525 (WK,) *Starlight Associates* v. *Berkey-Colortran Ins.*

3,941,194. (See 3,774,693.)

3,953,025, Martin S. Mazman, MUSCLE BUILDING EXERCISE DEVICE, **filed** Nov. 17, 1976, D.C., E.D. Calif. (Fresno), Doc. F–76–211, *Universal Gym Equipment* v. *Martin Mazman and DeWayne Zinkin.* Action dismissed with prejudice by stipulation of the parties on Feb. 6, 1979.

3,953,335. (See 3,852,201.)

3,965,625, Stevan C. White, CANOPY SUPPORT TOWERS WITH ADJUSTABLE CANOPY, **filed** Aug. 27, 1979, D.C., E.D. Ark. (Little Rock), Doc. LR–C–79–371, *Music Circuit Productions, Inc. and Stevan C. White* v. *Riek Calhoun & Associates, Inc. and Calbro Sound, Inc.*

3,966,396, Bruce Howes, TEXTILE PRINTING PROCESS AND TRANSFER MEDIUM, **filed** June 21, 1978, D.C.N.J. (Newark), Doc. C–78–1364, *Bruce Howes* v. *Einson-Freeman and Detroy Corporation*

3,967,748, Thermo Seal, Inc., DRINKING RECEPTACLE VALVE MEANS, **filed** Jan. 9, 1979, D.C., S.D. Tex. (Houston), Doc. C.A. H–79–45, *Thermo Seal, Inc.* v. *Dart Industries, Inc. et al.*

3,968,879, George A. Lucas & Sons, SHIPPING CONTAINER AND ASSEMBLY THEREOF, **filed** May 19, 1978, D.C., E.D. Calif. (Fresno), Doc. F–78–107, *George A. Lucas & Sons* v. *Styro Tek Inc.*

3,974,925, Girard J. McKenzie, LOADER AND TREE REMOVER, **filed** Aug. 8, 1979, D.C., M.D. Fla. (Tampa), Doc. 79–840–C T.K., *Griffin Grove Service, Inc.* v. *Girard J. McKenzie.*

3,987,467, David W. Cowles, PHOTOGRAPHIC FILM IDENTIFICATION SYSTEM, **filed** Aug. 15, 1979, D.C., W.D. Wash. (Seattle), Doc. C79–955S, *CX Corporation* v. *Shastar Corporation.*

3,991,405. (See 3,200,340.)

4,009,430, Donald F. Partridge, ANTIPARALLEL COMMUTATED INVERTER, **filed** Sept. 4, 1979, D.C. Oreg. (Portland), Doc. 79–1029, *P.P.S. Manufacturing, Inc.* v. *Beaver Induction Services, Inc. and Victor W. Hatch.*

4,016,763. (See 3,859,594.)

4,029,442, Edward Bleiweiss, HIGH PRESSURE PISTON PUMP AND WIPER, SEALING, VALVING STRUCTURE; **4,035,109,** Drath and Schlosser, PUMP FOR FLUENT, AND ESPECIALLY HEAVY AND ABRASIVE MATERIALS, **filed** June 19, 1979, D.C., S.D. Tex. (Houston), Doc. H–79–1252, *Edward Bleiweiss* v. *Xenex Corporation.*

4,033,167, General Signal Corporation, PROCESS FOR FORMING INTERMEDIATE METAL CONDUIT, **filed** Aug. 17, 1979, D.C. Conn. (Bridgeport), Doc. B–79–340, *Allied Tube & Conduit Corp.* v. *General Signal Corp.*

4,035,109. (See 4,029,442.)

4,035,619 (See 3,859,776.)

4,036,486. C & H Manufacturing Company, STOP MEANS FOR MAT BOARD CUTTER, **filed** May 18, 1979, D.C., S.D. Miss. (Jackson), Doc. J79–0261(N), *C & H Manufacturing Company* v. *Keeton Products International, Inc.* Order of dismissal with prejudice filed Aug. 16, 1979.

4,040,806, Kenneth B. Kennedy, PROCESS FOR PURIFYING HYDROCARBON GAS STREAMS, **filed** Aug. 15, 1979, D.C. N. Mex. (Albuquerque), Doc. 79–652B, *K. B. Kennedy Engineering Co., Inc.* v. *Southwestern Public Service Company and Tuco, Inc.*

4,044,193, Prototech Company, FINELY PARTICULATED COLLOIDAL PLATINUM COMPOUND AND SOL FOR PRODUCING THE SAME, AND METHOD OF PREPARATION OF FUEL CELL ELECTRODES AND THE LIKE EMPLOYING THE SAME, **filed** Aug. 14, 1979, D.C. Mass. (Boston), Doc. CA. 79–1598–K, *United Technologies Corp.* v. *Prototech Company.*

4,073,322, National Instrument Co., Inc. HIGH-SPEED FILLING MACHINE; **4,083,389,** Sidney Rosen and National Instrument Company, Inc., STAR-WHEEL INDEXING SYSTEM FOR AUTOMATIC FILLING MACHINES, **filed** Sept. 11, 1979, D.C., E.D. Pa. (Philadelphia), Doc. 79–3317, *National Instrument Company, Inc. et al.* v. *Adtech Design Co., Inc.*

4,077,400, Roy M. Harrigan, EXTERNAL CARDIAC RESUSCITATION AID, **filed** Sept. 21, 1979, D.C. Vt. (Burlington), Doc. 79–219, *Roy M. Harrigan* v. *Pepin Distributing, Inc.*

4,077,400, Roy M. Harrigan, EXTERNAL CARDIAC RESUSCITATION AID; **4,095,590,** same; **4,166,458,** same, **filed** Sept. 17, 1979, D.C. Del. (Wilmington), Doc. 79–446, *Pepin Distributing Inc.* v. *Harrigan Medical Products, Inc.*

4,079,584, American Hoist & Derrick Company, HEAVY DUTY SHACKLE, **filed** Aug. 27, 1979, D.C. Oreg. (Portland), Doc. 79–983, *American Hoist & Derrick Company* v. *Sowa & Sons, Inc.*

4,083,389. (See 4,073,322.)

4,090,694, Clarence K. Vincent, GO-CART GUARD RAIL, **filed** Sept. 7, 1979, D.C., S.D. Tex. (Houston), Doc. H–79–1854, *Clarence K. Vincent* v. *Robert J. Tupper et al.*

4,095,590. (See 4,077,400.)

4,141,361, Snyder Manufacturing Company, Inc. EVACUATOR, **filed** Sept. 11, 1979, D.C., E.D. Mo. (St. Louis), Doc. 79–1110C(1), *Sherwood Medical Industries, Inc.* v. *Snyder Mfg. Co., Inc. & Snyder Laboratories, Inc.*

4,149,331, Jack Prager, FRAME FOR DISPLAYING PHOTOGRAPHS OR THE LIKE, **filed** Aug. 31, 1979, D.C., C.D. Calif. (Los Angeles), Doc. 79–03396–RJK (Px), *Photo Art Frames Inc.* v. *Jack Prager & Prager and Associates, Ltd.*

4,159,251. Wrasidlo & Spiegelman, ULTRAFILTRATION MEMBRAMES BASED ON HETEROAROMATIC POLYMERS, **filed** Apr. 20, 1979, D.C., C.D. Ill. (Danville), Doc. 79–2070, *Pharmaco, Inc.* v. *Dr. Wolfgang Wrasidlo and Dr. Sol Spiegelman.*

4,166,458. (See 4,077,400.)

Re. 27,999, Dr. Ing Max Schloetter Fabric fur Galvanotechnik, ELECTROPLATING BATH FOR DEPOSITING BRIGHT ZINC PLATES, **filed** May 23, 1974, D.C., N.D. Ind. (South Bend), Doc. S74–117, *Dr. Ing. Max Schloetter, Fabrik fur Galvanotechnik and Lea-Ronal, Inc.* v. *Railoc of Indiana,* Inc. Stipulation dismissing action and amended counterclaim without prejudice filed Sept. 4, 1979. **Same, filed** Sept. 14, 1979, D.C., N.D. Ohio (Cleveland), Doc. C79–1778, *Dr. Ing. Max Schloetter Fabrik fur Galvanotechnik* v. *Pavco, Inc.*

Re. 29,321. (See 3,699,815.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,077,724, Re. S.N. 075,965, Filed Sep. 17, 1979, Cl. 57/286, APPARATUS FOR PROCESSING YARNS, Nicholas J. Stoddard, et al., Owner of Record: *Lextex Ltd. Inc., Ft. Lauderdale, Fla.,* Attorney or Agent: Henry H. Skillman, Ex. Gp.: 244

3,091,912, Re. S.N. 075,967, Filed Sep. 17, 1979, Cl. 57/247, METHOD OF PROCESSING STRETCH YARN AND YARNS PRODUCED THEREBY, Nicholas J. Stoddard, et al., Owner of Record: *Lextex Ltd. Inc., Ft. Lauderdale, Fla.,* Attorney or Agent: Henry H. Skillman, Ex. Gp.: 244

3,472,011, Re. S.N. 075,966, Filed Sep. 17, 1979, Cl. 57/34 TREATMENT OF ARTIFICIAL YARNS AND THREADS, Ernest P. R. Scragg, Owner of Record: *Lextex Ltd. Inc., Ft. Lauderdale, Fla.,* Attorney or Agent: Henry H. Skillman, Ex. Gp.: 244

4,016,261, Re. S.N. 029,040, Filed Apr. 11, 1979, Cl. 424/180, THERAPEUTIC COMPOSITION AND METHOD OF THERAPEUTICALLY TREATING WARM BLOODED ANIMALS THEREWITH, Paul Gordon, Owner of Record: *Strategic Medical Research Corp., Greenwich, Conn.,* Attorney or Agent: Robert D. Bajefsky, Ex. Gp.: 124

4,017,608, Re. S.N. 029,039, Filed Apr. 11, 1979, Cl. 424/180, THERAPEUTIC COMPOSITION AND METHOD OF THERAPEUTICALLY TREATING WARM BLOODED ANIMALS THEREWITH, Paul Gordon, Owner of Record: *Strategic Medical Research Corp., Greenwich, Conn.,* Attorney or Agent: Robert D. Bajefsky, Ex. Gp.: 124

4,060,294, Re. S.N. 043,908, Filed May 30, 1979, Cl. 339/4, WALL PANEL WITH PREWIRED POWER SYSTEM, Richard G. Haworth, et al., Owner of Record: *Haworth Mfg., Inc., Holland, Mich.,* Attorney or Agent: Raywood H. Blanchard et al., Ex. Gp.: 322

4,088,218, Re. S.N. 059,864, Filed Jul. 23, 1979, Cl. 400/208, RIBBON CASSETTE WITH BI-COLOR CAPABILITY, Noel F. Depew, Owner of Record: *NCR Corporation, Dayton, Ohio,* Attorney or Agent: W. Wawk, et al., Ex. Gp.: 337

PATENT NOTICES

Certificates of Correction for the Week of Nov. 6, 1979

Re. 30,081	4,129,711	4,145,665	4,155,275
D. 252,379	4,129,723	4,147,356	4,155,641
3,900,693	4,130,983	4,147,627	4,156,076
3,941,109	4,132,595	4,148,827	4,156,449
3,963,783	4,132,612	4,148,839	4,156,821
3,972,676	4,132,613	4,149,244	4,156,850
4,012,689	4,133,168	4,149,363	4,156,939
4,017,845	4,133,976	4,149,612	4,157,061
4,029,449	4,135,111	4,149,916	4,157,258
4,032,366	4,135,243	4,150,148	4,158,050
4,035,243	4,136,047	4,150,292	4,158,429
4,050,893	4,136,093	4,150,677	4,158,706
4,066,780	4,136,243	4,150,822	4,158,739
4,083,803	4,136,369	4,150,845	4,158,750
4,087,630	4,136,627	4,150,902	4,159,914
4,089,726	4,136,969	4,151,109	4,160,120
4,091,448	4,137,009	4,151,185	4,160,270
4,099,405	4,137,105	4,151,341	4,160,750
4,103,593	4,137,516	4,151,457	4,160,902
4,104,465	4,138,214	4,151,851	4,161,076
4,108,530	4,138,503	4,152,159	4,161,250
4,108,532	4,138,545	4,152,347	4,161,256
4,109,942	4,138,581	4,152,414	4,161,514
4,110,459	4,138,705	4,152,547	4,161,675
4,111,491	4,139,497	4,153,356	4,161,872
4,111,782	4,140,169	4,153,522	4,162,145
4,112,105	4,141,352	4,153,642	4,162,212
4,112,214	4,141,356	4,153,702	4,162,236
4,117,011	4,141,907	4,153,896	4,162,697
4,120,877	4,141,989	4,154,287	4,163,127
4,122,547	4,142,028	4,154,494	4,163,754
4,123,467	4,142,061	4,154,726	4,163,856
4,125,771	4,142,855	4,154,841	4,164,140
4,125,917	4,142,858	4,154,856	4,164,156
4,126,787	4,144,549	4,154,877	4,164,639
4,129,378	4,144,727	4,155,238	4,165,863
4,129,448	4,144,961		

Disclaimers

3,092,722.—*Hugh K. Howerton,* Silver Spring, Md. SPECTRO-PHOSPHORESCENCE MEASURING INSTRUMENT. Patent dated June 4, 1963. Disclaimer filed June 22, 1979, by the assignee, *Baxter Travenol Laboratories, Inc.*

Hereby enters this disclaimer to claims 3, 4, 6, 15 and 16 of said patent.

3,598,738.—*Charles B. Biswell,* Woodstown, N.J., *Mark Stanley Fawcett,* Chadds Ford, Pa., and *Andrew Mitchell,* Newark, Del. OIL COMPOSITIONS CONTAINING ETHYLENE COPOLYMERS. Patent dated Aug. 10, 1971. Disclaimer filed Sept. 26, 1979, by the assignee, *E. I. du Pont de Nemours and Company.*

Hereby enters this disclaimer to all claims of said patent.

3,852,847.—*Herbert Etz,* Wuppertal-Langerfeld, Germany. APPARATUS FOR MANUFACTURING TAMPONS. Patent dated Dec. 10, 1974. Disclaimer filed Aug. 27, 1979, by the assignee, *Dr. Carl Hahn KG.*

Hereby enters this disclaimer to claims 1–9 inclusive of said patent.

3,895,398.—*Bernard E. Mustee,* Cleveland, Ohio. FREE-STANDING SHOWER STALLS. Patent dated July 22, 1975. Disclaimer filed Aug. 17, 1979, by the assignee, *E. L. Mustee & Sons, Inc.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,984,336.—*Ronald J. Cier,* East Windsor; *Albert L. Williams,* Princeton; and *Robert F. Bridger,* Hopewell, N.J. LUBRICANT COMPOSITIONS. Patent dated Oct. 5, 1976. Disclaimer filed Sept. 6, 1979, by the assignee, *Mobil Oil Corporation.*

Hereby enters this disclaimer to claims 1, 2, 9, 12 and 13 of said patent.

3,990,595.—*Delwin E. Cobb,* Peoria; *Gerald P. Simmons,* Washington; and *Orrin A. Stemler,* East Peoria, Ill. MOUNTING ARRANGEMENT FOR IMPACT ROCK BREAKER. Patent dated Nov. 9, 1976. Disclaimer filed Aug. 29, 1979, by the assignee, *Caterpillar Tractor Co.*

Hereby enters this disclaimer to claims 1, 2, 3, 8 and 9 of said patent.

4,081,533.—*Dean W. Cheesman,* Kentfield, Calif. METHOD OF REDUCING MAMMALIAN FERTILITY AND DRUGS THEREFOR. Patent dated Mar. 28, 1978. Disclaimer filed Aug. 27, 1979, by the assignee, *The Regents of the University of California.*

Hereby enters this disclaimer to claims 12 and 14 of said patent.

4,117,506.—*David Emil Carlson,* Yardley, Pa. and *Christopher Roman Wronski,* Princeton, N.J. AMORPHOUS SILICON PHOTOVOLTAIC DEVICE HAVING AN INSULATING LAYER. Patent dated Sept. 26, 1978. Disclaimer filed Sept. 27, 1979, by the assignee, *RCA Corporation.*

Hereby enters this disclaimer to claims 1 through 8 of said patent.

4,159,143.—*Bernard Erwin Proeschl,* Decatur, Ill. TRUCK BODY CORNER JOINT. Patent dated June 26, 1979. Disclaimer filed Aug. 31, 1979, by the assignee, *Caterpillar Tractor Co.*

Hereby enters this disclaimer to claim 1 of said patent.

3,710,618.—*Armin B. Pagel,* Janesville, Wis. TORQUE SENSING INSTRUMENTS. Patent dated Jan. 16, 1972. Dedication filed Sept. 4, 1979, by the assignee, *Dana Corporation.*

Hereby dedicates to the Public the remaining term of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
California	Los Angeles Public Library	(213) 626–7555 Ext. 274
	Sacramento: California State Library	(916) 322–4572
	Sunnyvale Patent Library*	(408) 736-0795
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
Illinois	Chicago Public Library	(312) 269-2814
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1458
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(404) 472-3411
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County Public Library	(513) 369-6969
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 242–7361 Ext. 258
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
	University Park: The Pennsylvania State Libraries	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 528-2957
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library. Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 28, 1979

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-8-79
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines: Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	8-18-78
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, Treating Processes, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.	10-13-78
COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.	6-21-78
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-6-78
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.	12-19-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear and Reactors; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptograph; Laser Devices; Radioactive Materials; Power Metallurgy, Rocket Fuels.	4-10-78
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	7-12-78
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-7-78
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-31-78
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-21-77
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-1-78
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.	9-25-78
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.	7-21-78
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-9-78
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Textiles; Apparel and Shoes; Sewing Machines; Machine Elements; Clutches.	2-16-78

Expiration of patents: The patents within the range of numbers indicated below expire during July 1979, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,041,614 to 3,047,872, inclusive
Plant Patents..... Numbers 2,155 to 2,159, inclusive

XEROX LICENSE OFFER

This notice is published pursuant to a CONSENT ORDER TO CEASE AND DESIST dated July 29, 1975 between Xerox Corporation and the Federal Trade Commission.

TERMS *contained in this notice are defined in the Consent Order. All interested parties should refer to that document for the definitions and additional details of Xerox' patent and know-how licensing obligations thereunder.* A copy of the Consent Order and a list of PATENTS licensed to Xerox which are subject to the provisions of paragraphs II and IV (C) (9) of the Order, if any, are available from Xerox upon written request. All such requests and any request relating to the licensing of PATENTS and the licensing and disclosure of KNOW-HOW pursuant to the Consent Order should be made in writing and addressed to:

The Manager of Patent Licensing
Xerox Corporation
Stamford, Connecticut 06904

Xerox shall in accordance with the terms of the Consent Order:

(1) Grant licenses under

(a) its ORDER PATENTS to make, have made, use and vend OFFICE COPIER PRODUCTS under the terms of the Consent Order, and

(b) patents which are required to be licensed pursuant to the terms of paragraph X of the Consent Order, if any, and

(2) Disclose certain written materials as provided in the Consent Order [KNOW-HOW] to any LICENSEE of its United States ORDER PATENTS for use in connection with the manufacture of OFFICE COPIER PRODUCTS in the United States upon payment of the cost of collection and duplication of the requested materials.

The following is a list of patents which is believed to include all of the PATENTS available for licensing in accordance with the terms of the Consent Order. Fuji Xerox, Ltd. patents which also make up part of the list are grouped separately. There also follows a classification index for use in conjunction with the classification data appearing in the patent list to identify the category of the patent and a schedule of foreign countries and their corresponding key letters which are used in identifying corresponding foreign patents in the list. Since the classification system is not restricted solely to OFFICE COPIER PRODUCTS there are several patents included in the list to which the Consent Order is not applicable.

LIST CLASSIFICATION

The Patents are listed in numerical order according to their class assignment. For example, all U.S. patents classified as 1(A) appear at the beginning followed by those classified as 1A1, 1A1A, 1A1B, etc. The left-hand column shows the U.S. patent number. To the right of the U.S. patent number is its title followed by its issue date. Following the U.S. patent issue date is a list of the foreign patents based on the U.S. patents. An example of how the list should be used is as follows:

Under Class 1A which is entitled "Electrostatographic Systems, Imaging Systems—Distinctive Photosensitive Members Imaged", two U.S. patents are listed—2,573,881 which issued November 6, 1951 with corresponding patents in Australia, Canada, Germany, Great Britain, Switzerland and Sweden, and 3,877,936 which issued April 15, 1975 with a corresponding patent in Belgium.

XEROX PATENT CLASSIFICATION INDEX

TABLE OF CONTENTS

1. Electrostatographic Systems
2. Distinctive Photosensitive Members
3. Charging Systems
4. Optical Image Formation and Projection
5. Latent Image Development Systems and Compositions
6. Copy Substrate Handling Systems
7. Developed Image Transfer & Display
8. Image Fixing Systems
9. Cleaning of Imaging Surface
10. Document Handling
12. Photoelectrophoresis
15. Imaging Systems Other Than Electrostatographic
17. Optical Systems
18. Chemical Compositions & Preparation Thereof
20. Mechanical Components
21. Metal Working, Forming and Treating
24. Graphic Arts
25. Electronic Components
26. Design Patents
27. Photography
30. Manifold
31. Migration Imaging (XDM)
32. Miscellaneous

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     1. Inorganic Photosensitive Members
        - a. Selenium
        - b. Alloys of Selenium
        - c. Zinc or Cadmium Chalcogenides
        - d. PbO in Binder
        - e. Group IIIa Phosphides
        - f. Photosensitive Glass, Glass Binders and Ceramics
     2. Organic Photosensitive Members
        - a. Organic Photoconductor in Binder
        - b. Charge Transfer Complexes
        - c. Photochromic Compounds
        - d. Photopolymerizable Compounds
     3. Photosensitive Members with Subadjacent Barrier Layer
     4. Photosensitive Members with Protective Overlayer
     5. Fibrous Photosensitive Members
     6. Multilayered Members (Support-Intermediate Layer-Photoconductor)
   - B. Imaging Systems—Imaged Non-Photosensitive Members
     1. Non-Photosensitive Members
     2. Induction Imaging Systems
     3. Xeroprinting Systems
     4. TESI Printing Systems
        - a. Method
        - b. Apparatus
   - C. Imaging Systems with Variation in Final Copy
     1. Imaging Systems with Size Reduction
     2. Imaging Systems with Enlargement
     3. Half-tone Imaging Systems
     4. Deformation Imaging Systems
        - a. Frost
        - b. Relief
     5. Reversal Printing Systems
   - D. Duplex Imaging Systems
   - E. Color Xerographic Systems
   - F. Imaging Systems for Preparing Duplicating Masters
   - G. Imaging Systems—Distinctive Development Systems
     1. Magnetic Recording Systems
     2. Multiple Copying Systems with Partial Transfer
     3. Imaging Systems Employing Adhesive Transfer Web
     4. Imaging Systems Employing Toner Coated Plates
     5. Imaging Systems Capable of Development in Ambient Light
     6. Imaging Systems with Liquid Polar Ink Development
   - H. Display Systems with Imaging Capability
     1. Projection of a Xerographic Image (PROXI)
     2. Pin Matrix
   - I. Imaging Systems with Image Enhancement
   - J. Electrostatographic Apparatus
     1. Total Reproduction Systems
     2. Cameras
     3. Variable Imaging Speed
     4. Moving Document Reproduction
     5. Flat Plate Electrostatographic Apparatus
     6. Flexible Electrostatographic Apparatus
     7. Count Control Apparatus
     8. Developer Dispensing and Control Apparatus
   - K. Miscellaneous Methods and Apparatus
     1. Electrometers
     2. Reflex Imaging Systems
     3. Resist Formation System
2. DISTINCTIVE PHOTOSENSITIVE MEMBERS
   - A. Photosensitive Members—Novel Compositions
     1. Inorganic
        - a. Selenium
        - b. Alloys of Selenium with Arsenic and/or Antimony
        - c. As_2S_3 and Combinations Thereof with Selenium
        - d. Group III A Phosphides (Ga, Al or B)
        - e. Chalcogenides (Compounds Containing O, S, Se, or Te)
          - (1) ZnO
          - (2) PbO
        - f. Dye Sensitized Inorganic Photoconductors
        - g. Inorganic Photoconductors in Glass Binders
     2. Organic
        - a. Photosensitive Organic Compounds in a Binder
        - b. Lewis Acid Charge Transfer Complexes
   - B. Multi-Layered Photosensitive Members
     1. Members Having Subadjacent Barrier Layers
     2. Members Having Protective Overlayer
     3. Members Having Electroluminescent Layer
     4. Members Having Releasable or Soluble Layer
   - C. Deformation Imaging Members
   - D. Fibrous Photosensitive Member
   - E. Photosensitive Members—Novem Fabrication Techniques and Configurations
   - F. Apparatus for Alignment of Photosensitive members
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   - A. Induction Charging Systems
   - B. Non-Uniform Charging Systems
   - C. Corotron Charging Systems
     1. A.C. Charging
     2. Negative Charging
     3. With Fringe or Needle-like Electrodes
     4. Scorotron Charging
     5. Bipolar Charging
     6. Charge Level Smoothing
     7. Toner Dust Control
     8. Charge Sensing to Terminate Charging

9. Transfer From Intermediate Insulating Member

D. Charging Across a Liquid Layer

E. Charging a Semiconductive Photoconductor

F. Charging Including Illumination of Photoconductor

4. OPTICAL IMAGE FORMATION AND PROJECTION

A. Illumination of Original

1. Light Sources and Method of Illumination
2. Document Holders
   a. Platen Covers
3. Illumination Control Systems

B. Projection of Optical Image onto Photoresponsive Member

1. Scanning Systems—In General
   a. Distinctive Optical Scanning Systems
      (1) Lens Strip
      (2) Fiber Optics
      (3) Half Tone Projection Systems
      (4) Fresnel Lens
2. Simultaneous Charging and Projection of Optical Image
3. Distortion of Optical Image (e.g., for Coding Purposes)
4. Full Frame Exposure
5. Reflex Exposure
6. Projection with Variable Magnification
   a. Magnification with Fixed Optical Path Length
7. Projection of Composite Image

C. Control of Image Contrast

5. LATENT IMAGE DEVELOPMENT SYSTEMS AND COMPOSITIONS

A. Powder Cloud Development

1. Aerosol Development Methods and Apparatus in General
   a. Plate Development Apparatus
2. Cloud Charging Methods and Devices
3. Specific Toner and/or Gas Supply Devices and Methods
   a. Belt and Porous Material Toner Supply Device
   b. Cloud Directing Devices and Methods
4. Induction Development
5. Cleaning Devices
6. Charcoal Development Method

B. Fibrous Brush Development Devices and Methods

C. Magnetic Brush Development (Dry)

1. Magnetic Brush Development Methods and Devices
   a. Magnetic Belt Devices
   b. Loading Devices
2. Color Producing Development
3. Single Component Magnetic Developer

D. Cascade Development

1. Gravitational Developer Handling Methods and Devices
   a. Incremental (e.g., Bucket Devices)
   b. Continuous (e.g., Wheel)
   c. Magnetic
   d. Non-Linear Developer Flow
2. Impact Developing Methods and Devices
3. Developer Contact and Concentration Control Apparatus
4. Background Suppression Apparatus
5. Flat Plate Development

E. Liquid Development

1. Liquid Aerosol Development
2. Emulsion Development
3. Encapsulated Liquid Development
4. Electrophoretic Development
5. Polar Ink Development

F. Donor Development Methods and Apparatus

G. Dense Bed Development Methods and Apparatus

H. Fluidized Bed Development Methods and Apparatus

I. Toner and Developer Dispensing Methods and Apparatus

1. Developer Dispensing
2. Toner Dispensing
   a. Powdered Toner Containers
   b. Solid Toner Containers
   c. Dispensing Apparatus
      (1) Without Concentration Control
      (2) With Concentration Control

J. Development Electrodes

1. Electrode Types in General
2. Segmented Electrodes
3. Flexible Electrodes
4. Self-Cleaning Electrodes
5. With Variation of Potential

K. Contrast and Large Area Development Enhancement

L. Simultaneous Positive-Negative Formation

M. Reversal Development

N. Developer, Toner and Carrier Compositions

1. Three Component Developer-Carrier, Toner and Additive
   a. Inorganic Additive
   b. Organic Additive
2. Two Component Developer
   a. Distinctive Toner
      (1) Polystyrene-Containing
      (2) Phenol-Formaldehyde Containing
   b. Distinctive Carrier
3. One Component
4. New Carriers
5. New Toners
   a. Distinctive Pigment
   b. Encapsulated Liquids
6. Developer Manufacture
   a. Carrier Preparation
   b. Toner Preparation

O. Miscellaneous

P. Simultaneous Development and Cleaning

6. COPY SUBSTRATE HANDLING SYSTEMS

A. Paper Holding Trays

1. With Stack Height Control

B. Seriatim Stack Feeding Devices

1. Mechanical
2. Aeriform

C. Non-Seriatim Stack Feeding Devices

D. Sheet Tracking, Registration, Aligning, Conveying Devices

1. Belt Conveyors
2. Clutch Mechanisms

E. Sheet Holding Devices (During Image Transfer)

F. Mispuff and Multiple Sheet Detecting Devices

G. Counter Devices
H. Sheet Stripping Devices
I. Sheet Cutting Devices
J. Sheet Inverting Devices
K. Copy Distribution, Collection and Sorting Devices

7. DEVELOPED IMAGE TRANSFER AND DISPLAY
A. Image Display Systems
1. Reflective Projection
2. Transmittive Projection
B. Chemical Treatment to Enhance Transfer
C. Electrostatic Transfer of Toner
1. Corona Charging Systems
a. With Conductive Transfer Web
2. A.C. Field Transfer
3. Multiple Transfer
4. Selective Transfer
D. Magnetic Transfer of Toner
E. Pressure Transfer of Toner
1. With Heat
2. With Solvent
3. With Tackified Copy Substrate
a. Gelatin Coated Substrate

8. IMAGE FIXING SYSTEMS
A. Heat Fixation
1. Radiation
a. Flash Heating
b. Control Systems
c. Glass Panel Heating
2. Conduction
a. With Pressure Means
3. Convection
4. Induction
B. Fixation with Vapor Fixative
1. Fixative Removal
C. Fixation with Liquid Fixative
D. Fixation with Solid Fixative
E. Fixation with Pressure
1. Gelatin Coated Copy Substrate

9. CLEANING OF IMAGING SURFACE
A. Frictional
1. Web
2. Brush
a. With Brush Scraper
b. With Electrostatic Assist
(1) Within a Liquid
c. Filter Bag For Use with
B. Non-Frictional
1. Magnetic Brush
2. Cleaning Beads
3. Liquid

10. DOCUMENT HANDLING
A. Document Feed Apparatus
B. Microfiche Handling Systems
C. Stack Feeding Apparatus
D. Facsimile Feeding Apparatus
E. Document Registration Systems
F. Document Inverting Apparatus
G. Stacking and/or Imbricating Apparatus
H. Collating Apparatus
I. Document Jamming Detection Devices

12. PHOTOELECTROPHORESIS
A. Basic Process and Materials
B. Basic Apparatus
C. Machines
D. Air Breakdown
E. Blocking Electrode
F. Camera Apparatus
G. Cleaning
H. Apparatus Components
I. Composite Particle
J. Fixing
K. Inking
L. Masking
M. Pigments (Including PEP Use of Particular Pigment)
N. Process Variation
O. Sensitizors
P. Shear
Q. Transfer
R. Use of Image

15. IMAGING SYSTEMS OTHER THAN ELECTROSTATOGRAPHIC
A. Deformation Imaging
B. Polymerization Imaging
1. Photopolymerization Imaging
2. Charge Injection Polymerization Imaging
C. Ferromagnetic Imaging
D. Photochromic Imaging
E. Vesicular Imaging
F. Exposure Only Imaging

17. OPTICAL SYSTEMS
A. Radiation Sensing
1. X-ray, Ultraviolet
2. Solar Cell
3. Spectral Response Junctions
4. Photocell Circuits
B. Optical Projection and Modulation
1. Image Projection
2. Lenses, Transparencies
3. Kerr Cell
4. Modulators
C. Image Conversion and Intensification
1. Emission
2. Infrared
3. Passive
4. Active (Semiconductor)
D. Character Generation and Display Devices
1. Deflection Generated Display
2. Character Mask
3. Translation and Function Generation
4. Justifier
5. Optical Lens Arrangements
E. Optical Imaging and Scanning
1. Photosensitive Scanners and Spot Scanning Systems
2. Field Effect Scanners
3. Lenticular
4. Scanning Lens Strip and Rotating Mirror Mechanisms
5. Thermotropic, Thermal, Deformation
6. Optical Stabilizing Devices
F. Electron Beam Devices

1. Tubes
2. Circuits

G. Electroluminescent Devices
1. Storage with Field Effect Device
2. Storage Panels—Construction
3. Display, Actuation
4. Enhancement, Amplifications, Conversion

H. Stimulated Emission Devices
1. Laser Structure and Materials
2. Laser Structures
3. Laser Optical Systems and Applications

I. Optical Devices
1. Pressure Gauge
2. Density Measuring
3. Fiber Optics

J. Miscellaneous

18. CHEMICAL COMPOSITIONS AND PREPARATION THEREOF

A. Photosensitive
1. With a Liquid Vehicle
2. Phthalocyanine
a. X-Form
3. Carboxamides
4. Naphthols

B. Polymers

C. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component Developer
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Manufacture
b. Toner Preparation

D. Brazing Compositions

20. MECHANICAL COMPONENTS

A. Mechanical Reaction Devices
1. Belts
2. Drives
3. Pulleys and Rollers
4. Load Movers
5. Clutch
6. Transport Motor and Speed Controls

B. Dispensing and Filtering Devices
1. Powder Cloud
2. Particulate Material Dispensing, Distribution
3. Filtering

C. Sensing Devices
1. Powder Level
2. Temperature
3. Quality (Web)
4. Pressure Gauge
5. Wind
6. Weight
7. Thickness

D. Work Devices (Mechanical)
1. Holding, Forming, Feeding
2. Bonding and Fastening
3. Coupling (Pipe)
4. Testing
5. Molding
6. Valves
7. Sizing

E. Antenna Structure

F. Fluid Amplifiers and Magnetically Controllable Switching Devices

G. Miscellaneous

21. METAL WORKING, FORMING AND TREATING

A. Electroforming and Plating
1. Methods
2. Structure
3. Apparatus

B. Metal Treating

24. GRAPHIC ARTS

A. Liquid Ink Recording
1. Electrically Responsive System
2. Electromechanically Responsive System
3. Magnetically Responsive System
4. Photoresponsive System

B. Photographic Copying
1. Transparency Formation
a. Document Support
b. Projection and Exposure
(1) Simultaneous Exposure and Development of Different Frames
(2) Image Reversal Optics
(3) Automatic Masking
c. Transparency Identification
d. Frame Counting and Locating
e. Miscellaneous
2. Contact Printing From a Transparency
a. Transparency Feed
b. Establishing and Maintaining Contact Between Transparency and Copy Material
c. Exposure Control
d. Transfer Imaging
(1) Image Layer Support Strip
3. Processing
a. Material Purification
b. Transparency Transport
4. Viewing

C. Duplicating
1. Method and Apparatus
a. Thermographic
b. Pressure Applied to Sandwich of Original, Transfer and Receiving Sheet
c. Transfer of Electrostatic Charge Through Stencil
d. Condensation Imaging
e. Spirit and Dry Duplicating Systems (Including ELCAR)
(1) Means for Rotably Mounting a Transfer Sheet
(2) Means for Establishing Pressure Between Transfer Sheet and Copy Substrate
(3) Copy Substrate Handling
(4) Program Control
(5) Formation of a Spirit Duplicating Transfer Sheet
(6) Formation of a Stencil Transfer Sheet

(7) Composition of a Transfer Sheet, Receiving Sheets and Printing Inks

D. Planographic Imaging (Including Lithography)

E. Relief Imaging

F. Gravure Printing

G. Miscellaneous

25. ELECTRONIC COMPONENTS

A. Passive Components

1. Printed Circuit Boards
2. Semiconductor Devices
3. Thin Film Components
4. Connectors

B. Active Components

1. Space Charge Devices
2. Junction Devices
3. Thermionic Conversion Devices
4. Thyratrons

C. Circuits

1. Amplifiers
2. Switching
3. Oscillators and Generators
4. Pulse Circuitry, Including Signal Storage and Delay
5. Power Supply
6. Miscellaneous

26. DESIGN PATENTS

A. Reproduction Apparatus

1. In General
2. Document Feeding Apparatus
3. Transfer and Fusing Apparatus
4. Printer
5. Camera

B. Sorting and/or Storing Apparatus

C. Containers for Xerographic Powder

D. Labeling Apparatus

E. Facsimile Transmission Apparatus

1. In General
2. Transceiver Paper Feed Apparatus
3. Adapter for Facsimile Computer System

F. Microform Apparatus

1. Viewer and/or Copier

G. Educational Devices

1. Scales

H. Miscellaneous

1. Housing For Electronic Apparatus
2. Computer Keyboard
3. Send/Receive Data Printer Terminal
4. Telephone Acoustic Coupler
5. Prism
6. Paper Shredder
7. Other

27. PHOTOGRAPHY

A. Direct Printout Members

B. Direct Printout Processes

C. Imaging Member Fabrication

D. Photographic Processes Generally

30. MANIFOLD

A. Basic Process

B. Apparatus

C. Process Variations

D. Activation

E. Image Transfer and Fixing

F. Duplication Masters

G. Image Reversal

H. Reflex Imaging

I. Color Processes

31. MIGRATION IMAGING (XDM)

A. Basic Process

B. Apparatus

C. Process Variation

D. Imaging Members

E. Imaging Member Fabrication

F. Imaged Members

G. Stripping and Splitting

H. Reversal

I. Fixing

J. Duplicating Masters

K. Color

L. Use of Image

32. MISCELLANEOUS

A. Energy Cells

B. Miscellaneous

FOREIGN COUNTRY KEY LETTER CODE

COUNTRY KEY	COUNTRY NAME
AAA	NO FOREIGN FILING
ALB	ALBANIA
ALG	ALGERIA
ARG	ARGENTINA
ATR	AUSTRIA
AUS	AUSTRALIA
BAH	BAHAMAS
BAR	BAHRAIN
BEL	BELGIUM
BOL	BOLIVIA
BRA	BRAZIL
BRS	BR. SOLOMON ISL.
BRU	BRUNEI
BUL	BULGARIA
BUR	BURUNDI
CAM	CAMBODIA
CAN	CANADA
CEY	CEYLON
CHL	CHILE
CHN	CHINA
CLB	COLOMBIA
COR	CONGO REP. (ZAIRE)
COS	COSTA RICA
CUB	CUBA
CZC	CZECHOSLOVAKIA
DNK	DENMARK
DOR	DOMINICAN REP.
ECD	ECUADOR
EGP	EGYPT
EGR	E. GERMANY
EIR	EIRE
ELS	EL SALVADOR
FIJ	FIJI
FIN	FINLAND
FOM	FORMOSA
FRA	FRANCE
GER	GERMANY
GHA	GHANA
GIB	GIBRALTAR
GIE	GIBERT & ELLICE
GNR	GUINEA REP.
GRB	GR. BRITAIN
GRK	GREECE
GUA	GUATEMELA
GUR	GUERNSEY
HGK	HONG KONG
HOL	HOLLAND
HON	HONDURAS
HUN	HUNGARY
ICE	ICELAND
IDS	INDONESIA
IND	INDIA
IRL	IRELAND
IRN	IRAN
ISR	ISRAEL
ITL	ITALY
JAM	JAMAICA
JAP	JAPAN

COUNTRY KEY	COUNTRY NAME
JER	JERSEY
KEN	KENYA
KOR	KOREA
KUW	KUWAIT
LAS	LAOS
LEB	LEBANON
LIB	LIBERIA
LXB	LUXEMBOURG
MAU	MAURITIUS
MEX	MEXICO
MLI	MALI
MLS	MALASIA
MLT	MALTA
MLW	MALAWI
MNC	MONACO
MRC	MOROCCO
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PLD	POLAND
PLP	PHILIPPINES
PNM	PANAMA
PRU	PERU
PTG	PORTUGAL
RHD	RHODESIA
RMN	RUMANIA
RWD	RWANDA
SAB	SAUDI ARABIA
SAF	SOUTH AFRICA
SBH	SABAH
SGP	SINGAPORE
SHL	ST. HELENA
SLN	SIERRA LEONE
SPN	SPAIN
SRK	SARAWAK
STZ	SWITZERLAND
SWA	SO. WEST AFRICA
SWD	SWEDEN
SYA	SYRIA
TGR	TANGIER
THL	THAILAND
TIW	TAIWAN
TNS	TUNIS
TRD	TRINIDAD
TRK	TURKEY
TZN	TANZANIA
UGD	UGANDA
UK	UNITED KINGDOM (Fuji Xerox list only)
URG	URUGUAY
USA	USA
USR	USSR
UAR	UNITED ARAB REP.
VTM	VIETNAM
VZL	VENEZUELA
YGS	YUGOSLAVIA
ZMB	ZAMBIA
ZZZ	

FUJI XEROX PATENTS

Class 1A1C

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%. APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1,522,612, ITL. 798303, NOR. 122730, U.K. 1,183,762.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 1A1F

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 1A2

4,105,466.—ORGANIC PHOTOCONDUCTIVE COATING COMPOSITIONS CONTAINING TRICYANOVINYL COMPOUNDS FOR ELECTROPHOTOGRAPHY. AUG. 8, 1978. U.K. 1531921.

Class 1A2C

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,799,773.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A PHOTOCHROMIC COMPOUND AND TRANSPARENT TONER. MAR. 26, 1974.

Class 1A6

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 1C4B

3,563,733.—METHODS OF PREPARING RELIEF IMAGES BY ENZYMATIC DIGESTION. FEB. 16, 1971. BEL. 709856, CAN. 830395, FRA. 1564578, JAP. 46-11628, U.K. 1217087.

3,630,728.—ELECTROPHOTOGRAPHIC METHOD OF FORMING RELIEF IMAGES. DEC. 28, 1971. BEL. 728693, CAN. 877883, FRA. 2002.362, JAP. 46-41348, U.K, 1228509.

Class 1E

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,615,391.—ELECTROPHOTOGRAFHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,615,392.—ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS. OCT. 26, 1971. CAN. 902986, JAP. 46-43951.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 925929, JAP. 48-28697.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 7531555, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,779,639.—COLOR ELECTROPHOTOGRAPHIC APPARATUS. DEC. 18, 1973. U.K. 1331870.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-23905, U.K. 1322847.

3,806,340.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A POLAR ORGANIC SOLVENT VAPOR. APR. 23, 1974. BEL. 774765, CAN. 946671, FRA. 7138742, JAP. 49-23905, U.K. 1322847.

Class 1F

3,473,923.—REPRODUCTION PROCESS INCLUDING TRANSFER AND REDEVELOPMENT OF ELECTROSTATICALLY FORMED IMAGES. OCT. 21, 1969. BEL. 679506, FRA. 1479592, GER. 1,522,597. JAP. 43-07586, U.K. 1152832.

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

3,788,845.—PROCESS FOR FORMING DYE IMAGES. JAN. 29, 1974.

Class 1G

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 1G1

4,151,604.—IMAGE STORAGE AND OPTICAL READ-OUT DEVICE HAVING STRIPED ELECTRODES. APR. 24, 1979.

Class 1I

3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

Class 1J6

3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.

Class 1K

3,408,217.—FINGERPRINT RECORDING. OCT. 29, 1968. JAP. 41-21520, U.K. 1095572.

3,492,140.—METHOD OF RECORDING FINGERPRINTS OF HUMAN BODY. JAN. 7, 1970. FRA. 1386116, JAP. 39-27575, U.K. 1063635.

Class 1K3

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

Class 2A1E

3,506,595.—PHOTOCONDUCTIVE INSULATING MATERIALS. APR. 14, 1970. FRA. 1498064, GER. 1,522,606, JAP. 43-24394, U.K. 1148537.

3,615,401.—PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CdS OR CdS.N $CdCo_3$. OCT. 26, 1971. FRA. 2001257, JAP. 47-40819, U.K. 1239129.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

Class 2A1E1

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,494,766.—LIGHT SENSITIVE LAYER FOR ELECTROPHOTOGRAPHY. FEB. 10. 1970. CAN. 791648, FRA. 1460449, NOR. 112288, SWD. 226000, U.K. 1085939.

3,494,789.—PHOTOCONDUCTIVE INSULATING MATERIAL. FEB. 10, 1970. CAN. 813830, FRA. 1564467, ITL. 788829, JAP. 44-10631, MEX. 88112, U.K. 1120091.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 753155, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

3,725,060.—HEMATEIN OR HEMATOXYLIN-CONTAINING ZINC OXIDE PHOTOCONDUCTIVE LAYERS. APR. 3, 1973. JAP. 49-4340.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973. JAP. 45-990335.

Class 2A1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE CONTAINING ELECTRON DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,704,123.—DYE SENSITIZED PHOTOCONDUCTIVE MATERIAL. NOV. 28, 1972. AUS. 424510, BEL. 720260, CZC. 142206, FRA. 1568416, GER. 1772210, ITL. 831114, JAP. 47-20753, U.K. 1190676, USR. 374866.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

Class 2A1G

3,541,028.—PHOTOCONDUCTIVE INSULATING MATERIALS. NOV. 17, 1970. FRA. 1494699, GER. 1,522,605, JAP. 43-14494, U.K. 1128417.

Class 2A2

3,647,428.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAR. 7, 1972. AUS. 429949, BEL. 759550, CAN. 924162, FRA. 2072521, ITL. 923181, JAP. 48-4316, U.K. 1269429.

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 2A2A

3,707,369.—PHOTOCONDUCTIVE ELEMENTS CONTAINING 2-METHYL-3, 3-DIMETHYL INDOLE DERIVATIVES. DEC. 26, 1972. BEL. 754969, CAN. 898823, FRA. 703049, GER. 2041490, U.K. 1268889.

Class 2B

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPN. 371685, STZ. 519188, U.K. 1272131.

4,023,181.—RECORDING MEDIUM CONDUCTIVE ELECTRODE. MAY 10, 1977. JAP. 49-91720.

4,042,936.—ELECTROSENSITIVE RECORDING METHOD. AUG. 16, 1977. JAP. P49-042206.

Class 2B1

3,574,682.—ELECTROSTATIC RECORDING MATERIALS. APR. 13, 1971. U.K. 1213395.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 2B2

3,552,956.—METHOD FOR TREATING ELECTROPHOTOGRAPHIC RECORDING MATERIALS WITH PROTECTIVE OVERCOATINGS. JAN. 5, 1971. BEL. 693184, FRA. 1508918, SWD. 326372, U.K. 1155665.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762.808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

Class 2B4

3,428,453.—IMAGING FORMING PROCESS UTILIZING XEROGRAPHY. FEB. 18, 1969. FRA. 1,428,775, ITL. 754,825, JAP. 43-02622, U.K. 1,085,151.

Class 2E

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238, JAP. 40-26402, U.K. 1,081,324.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80% APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTOGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,672,988.—METHOD OF MANUFACTURING BASES FOR ELECTROSTATIC RECORDING MATERIAL OR ELECTROPHOTOGRAPHIC MATERIAL. JUNE 27, 1972. AUS. 437336, BEL. 746420, CAN. 898621, GER. 2008636, ITL. 888758, JAP. 47-45549, U.K. 1301926.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1522612, ITL. 798303, NOR. 122730, U.K. 1183762.

3,927,638.—VACUUM EVAPORATION PLATING APPARATUS. DEC. 23, 1975.

3,984,585.—VACUUM EVAPORATION PLATING METHOD. MAY 5, 1976. FRA. 7422500, GER. P-2430653.4, JAP. 48-72263, U.K. 1,214,698.

Class 2F

3,998,548.—SENSITIVE DRUM RECEIVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC REPRODUCING MACHINE. DEC. 21, 1976. JAP. 49-94060, U.K. 32984/75.

Class 3

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 3C

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED WITH A MIXTURE OF A HYGROSCOPIC MATERIAL AND A HYDROPHILIC BINDER. OCT. 12, 1971. BEL. 726690, CAN. 885615, JAP. 47-12440.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 3C1

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

Class 3C3

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972. CAN. 940590, JAP. 48-28301, U.K. 1279758.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972. CAN. 922359, JAP. 48-25942, U.K. 1323599.

Class 3C4

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973. CAN. 948693, FRA. 7108391, ITL. 921208, U.K. 1281149.

Class 3C5

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

3,779,749.—METHOD OF CHARGING IN ELECTROPHOTOGRAPHY. DEC. 18, 1973. BEL. 772412, CAN. 9481495, FRA. 7132246, ITL. 942080, JAP. 49-17532, U.K. 1359182.

3,788,844.—CHARGING METHOD FOR ELECTROPHOTOGRAPHY. JAN. 29, 1974. JAP. 49-13025, U.K. 1344908.

3,789,222.—CORONA CHARGE METHOD. JAN. 29, 1974. BEL. 771311, CAN. 943180, FRA. 7129655, ITL. 933902, JAP. 49-17530.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 3C9

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 906045, JAP. 46-30636.

Class 3D

3,546,545.—METHOD OF CHARGING A PHOTOCONDUCTIVE INSULATING LAYER. DEC. 8, 1970. BEL. 721040, FRA. 1586221, U.K. 1205297.

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

Class 3E

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPAN. 371685, STZ. 519188, U.K. 1272131.

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

Class 3F

3,749,927.—ELECTROSTATIC CHARGING PROCESS FOR ELECTROPHOTOSENSITIVE MATERIAL. JULY 31, 1973. AUS. 435008, BEL. 469413, FRA. 7123717, ITL. 934461, JAP. 49-16060, U.K. 1316047.

3,778,148.—APPARATUS AND METHOD FOR SELECTIVELY DISCHARGING THE PHOTOCONDUCTIVE SURFACE OF AN ELECTROSTATIC DRUM COPIER TO FACILITATE THE CLEANING THEREOF. DEC. 11, 1973.

3,778,623.—CHARGING METHOD OF ELECTROPHOTOGRAPHIC MATERIALS. DEC. 11, 1973. FRA. 7229549.

3,789,223.—CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS. JAN. 29, 1974. AUS. 431512, BEL. 771143, FRA. 7129349, ITL. 935108, JAP. 49-17529, U.K. 1347100.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 4A

3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.

Class 4A1

3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973. U.K. 1350616.

3,841,752.—LIGHT SOURCE FOR COPYING MACHINE. OCT. 15, 1974.

Class 4A2

3,737,223.—PLATEN DRIVING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 5, 1973. U.K. 1341619.

Class 4B

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. ARG. 182081, BEL. 759454, CAN. 932785, FRA. 7043828, ITL. 909538, JAP. 49-18265, U.K. 1327486.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-11573, U.K. 1326580.

Class 4B1

3,927,940.—MANUSCRIPT SCANNING DEVICE FOR COPYING MACHINES AND THE LIKE. DEC. 23, 1975.

3,955,048.—SCANNING METHOD AND APPARATUS. MAY 4, 1976.

Class 4B1A

3,778,153.—OPTICAL IMAGING SYSTEM. DEC. 11, 1973.

4,063,813.—METHOD OF EXPOSING A LIGHT SENSITIVE MEMBER. DEC. 20, 1977. JAP. 51-89646, U.K. 76-19272.

Class 4B7

3,313,883.—SYSTEMS FOR RECORDING CHARACTERS ON LIGHT SENSITIVE RECORDING SURFACES. AUG. 25, 1964. CAN. 693,055, FRA. 1,246,197, GER. 1,449,634, JAP. 318,009.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

Class 5A1A

3,451,376.—DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY. JUNE 24, 1969. AUS. 410555, FRA. 1556520, SWD. 319382, U.K. 1173377.

Class 5A2

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A3B

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A4

3,681,065.—DYE TRANSFER COLOR ELECTROPHOTOGRAPHY. AUG. 1, 1972. CAN. 884,227, JAP. 44-32208.

Class 5A5

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 915753, CAN. 933997, JAP. 48-13454.

Class 5C

3,927,641.—DEVELOPING MECHANISM USING MAGNETIC BRUSH. DEC. 23, 1975.

3,937,181.—MAGNETIC BRUSH TYPE DEVELOPING MECHANISM IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 10, 1976.

Class 5C1

3,545,968.—DEVELOPING A LATENT ELECTROSTATIC IMAGE WITH FERROMAGNETIC CARRIER AND TONER BY EMPLOYING A VARYING MAGNETIC FIELD. DEC. 8, 1970. BEL. 710692, FRA. 1561470, U.K. 1205175.

3,908,595.—MAGNETIC BRUSH DEVELOPMENT APPARATUS UTILIZING MAGNETIC MEANS. SEPT. 30, 1975.

3,977,361.—MAGNETIC BRUSH DEVELOPMENT DEVICE. AUG. 31, 1976. GER. P2521275.3, JAP. 49-52302, KOR. 3670, TIW. 6410622, U.K. 19955-75.

3,981,271.—MAGNETIC BRUSH TYPE DEVELOPER FOR USE IN AN ELECTROPHOTOGRAPHIC MACHINE. SEPT. 21, 1976. GER. P25073910, JAP. 49-19615, U.K. 6841-75.

3,985,099.—MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 12, 1976. GER. P2521291.3 JAP. 52303, KOR. 3669, TIW. 6410736, U.K. 19951-75.

4,048,958.—MAGNETIC BRUSH DEVELOPING DEVICE. SEPT. 20, 1977. KOR. 4052-74, TIW. 22,999, U.K. 9472/76, W. GER. P2611755.5.

Class 5C2

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 5D1

3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.

Class 5D2

3,336,904.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 22, 1967. BEL. 651786, GER. 1,472,946, HOL. 132649, JAP. 40-23755, U.K. 1068575.

Class 5D3

3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.

Class 5E

3,540,885.—REDUCTION OF FOG FORMATION IN AN ELECTROPHOTOGRAPHIC LIGHT SENSITIVE SHEET. NOV. 17, 1970. BEL. 693302, FRA. 1509571, JAP. 44-2551, U.K. 1176001.

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. BEL. 751669, CAN. 902982, FRA. 7021033, ITL. 893939, JAP. 48-18859, U.K. 1284477.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.

3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. ARG. 181932, AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, MEX. 116451, U.K. 1292200.

3,692,523.—PROCESS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE AND LIQUID DEVELOPER USED THEREFOR. SEPT. 19, 1972. AUS. 437065, BEL. 745533, CAN. 924.167, FRA. 7040233, GER. 20052680, ITL. 888.449, JAP. 48-7821, U.K. 1255445.

3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

3,749,059.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. JULY 31, 1973. AUS. 445683, BEL. 755061, CAN. 903579, FRA. 7029636, JAP. 48-25936, U.K. 1267888.

3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 948843, U.K. 1328313.

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430772, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,766,887.—DEVELOPING DEVICE FOR ELECTROSTATIC LATENT IMAGE. OCT. 28, 1973. AUS. 429869, BEL. 761227, CAN. 102437, FRA. 2075270, ITL. 919235, U.K. 1310092.
3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, JAP. 1348667, MEX. 120938.
3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.
3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.
3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.
3,991,711.—ELECTROSTATIC DUPLICATING METHOD AND APPARATUS UTILIZING WET DEVELOPING. NOV. 16, 1976. FRA. 733636, GER. 2350429, JAP. 47-101120, U.K. 1,443,209.
4,029,826.—ELECTROSTATIC PRINTING METHOD. JUNE 14, 1977. FRA. 7434015, GER. P2448211.9, JAP. 48-112875, U.K. 43016-74.

Class 5E4

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TOWER-FREE ZONE. MAY 4, 1971. AUS. 418640, CAN. 871081, FRA. 1592038, JAP. 46-11633, U.K. 1252917.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971. CAN. 939733, JAP. 48-34774, U.K. 1261752.
3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

Class 5I1

3,537,427.—ELECTROSTATIC LATENT IMAGE DEVELOPING DEVICE. NOV. 3, 1930. BEL. 722040, JAP. 46-14440, U.K. 1239635.
3,607,342.—METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 21, 1971. BEL. 707253, FRA. 1555753, JAP. 44-9878, U.K. 1204548.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5J

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 937783, U.K. 1328313.

Class 5J1

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 741.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, U.K. 1292200.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 19.74. BEL. 7 77528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.

Class 5J2

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5J3

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,672,330.—APPARATUS FOR DEVELOPING A LATENT ELECTROSTATIC IMAGE. JUNE 27, 1972. BEL. 708760, FRA. 149128, U.K. 1192600.

Class 5J5

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.
3,981,268.—DEVICE FOR CONTROLLING ELECTRIC POTENTIAL APPLIED TO DEVELOPING ELECTRODE IN AN ELECTROPHOTOGRAPHIC DUPLICATOR. SEPT. 21, 1976. GER. P2526802.4, JAP. 49-47554, KOR. 3672, TIW. 6410621, U.K. 24745-75.

Class 5K

3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

Class 5M

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 471.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,773,507.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS EMPLOYING A PRETONER. NOV. 20, 1973. AUS. 426720, BEL. 769893, CAN. 947812, FRA. 7124853, ITL. 934605, JAP. 49-5465, U.K. 1340947.

Class 5N

3,764,312.—ELECTROPHOTOGRAPHIC PROCESS. OCT. 9, 1973. FRA. 7146405, JAP. 49-26903.

Class 5N2B

4,020,192.—XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREIN. APR. 26, 1977. FRA. 7430644, GER. P2443013.1, JAP. 48-101085, U.K. 39509.

Class 5N5

3,941,898.—DEVELOPING METHOD UTILIZING PULVERIZED, COLORED, CROSSLINKED, VINYLIC POLYMER RESIN AS TONER. MAR. 2, 1976.

Class 5O

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.
3,565,613.—ELECTROLYTIC ELECTROPHOTOGRAPHY. FEB. 23, 1971. GER. 1597849, JAP. 44-13679, U.K. 1202409.

Class 5P

4,127,083.—DEVELOPER SEALING DEVICE FOR XEROGRAPHIC COPYING MACHINE. NOV. 28, 1978.

Class 6B1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.
3,927,877.—PAPER FEED TRAY FOR USE WITH COPYING MACHINE AND THE LIKE. DEC. 23, 1975.

Class 6C

3,901,427.—COPY PAPER FEEDER. AUG. 26, 1975.

Class 6D

3,924,848.—PAPER FEED APPARATUS FOR GRIPPER-TYPE PAPER TRANSPORT DEVICE. DEC. 9, 1975.
3,924,849.—PAPER GRIPPING DEVICE FOR USE WITH A CHAIN DRIVEN PAPER CARRIAGE. DEC. 9, 1975.

Class 6H

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 7C

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 7E1

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

Class 7E3A

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.
3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

Class 8A

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 8AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 8A1B

3,818,185.—HEAT FUSION-BONDING APPARATUS FOR ELECTROPHOTOGRAPHY. JUNE 18, 1974.
3,916,256.—PROTECTIVE CIRCUIT IN A TEMPERATURE REGULATOR FOR THE THERMAL FIXING DEVICE OF A DUPLICATOR. NOV. 4, 1975.

Class 8A2

3,904,786.—PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR. SEPT. 9, 1975.
3,981,269.—FIXING DEVICE FOR ELECTROPHOTOGRAPHIC DUPLICATING MACHINES. SEPT. 21, 1976. GER. P2507365.8, JAP. 31159, KOR. 3389, U.K. 5395-75.

Class 8A2A

3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.

Class 8B

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF A METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

Class 8C

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 9A

3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970. FRA. 1,474,687, ITL. 782,665, JAP. 44-12197, U.K. 1,143,923.
3,936,183.—ELECTROPHOTOGRAPHIC COPYING MACHINE WITH IMPROVED CLEANING BLADE. FEB. 3, 1976.

Class 9A1

3,766,592.—DRUM CLEANING DEVICE FOR AN ELECTROPHOTOGRAPHIC DUPLICATOR. OCT. 23, 1973.

Class 9B3

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.
3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

Class 10A, 10E

3,922,662.—DETECTOR FOR USE WITH A DUPLICATOR OR THE LIKE FOR DETECTING INCORRECTLY ALIGNED DOCUMENTS. NOV. 25, 1975.

Class 14A5

3,937,883.—BRAKING CIRCUIT FOR USE WITH PHASE SYNCHRONIZING CIRCUITRY. FEB. 10, 1976.

Class 15

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 15C

4,058,800.—IMAGE PICKUP ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES. NOV. 15, 1977. JAP. P49-137738.
4,054,866.—CONVERSION ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES. OCT. 18, 1977. JAP. P50-077558.
4,151,599.1.—MAGNETIC BUBBLE DISPLAY UNITS. APR. 24, 1979.

Class 17B1

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972. CAN. 931204, U.K. 1350795.

Class 17D3

3,936,664.—METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS. FEB. 3, 1976.

Class 18A

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238. JAP. 40-26402, U.K. 1,081,324.
3,730,711.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAY 1, 1973. BEL. 754699, CAN. 925087, FRA. 754699, GER. 2040152, JAP. 48-32381, U.K. 1272720.
3,799,340.—REFINING PHOTOCONDUCTIVE PARTICLE. MAR. 26, 1974. BEL. 776110, CAN. 944204, FRA. 714325.

Class 18A1

3,589,928.—PROCESS FOR THE PRODUCTION OF A LIGHT SENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY. JUNE 29, 1971. BEL. 685072, FRA. 1500187, GER. 1,522,603, JAP. 44-23775, U.K. 1139532.

3,607,363.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL. SEPT. 21, 1971. U.K. 1210071.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.
3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973. AUS. 451254, FRA. 71.09434, JAP. 48-43157, U.K. 1341627.
3,743,537.—METHOD OF MAKING ELECTROPHOTOGRAPHIC RECORDING MEMBER. JULY 3, 1973. AUS. 430736, ATR. 305766, BEL. 757.393, CAN. 928165, FRA. 7037234, ITL. 917004, JAP. 49-3846, U.K. 1269306.
3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973. AUS. 443292, CAN. 925743, JAP. 48-7820, U.K. 1284646.
3,803,011.—PROCESS FOR PREPARING 2, 3-DIHYDRO-1H,6H-1,5-BENZODIAZOCINE-2-ONE DERIVATIVE. APR. 9, 1974.

Class 18A2

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A3

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.
3,661,572.—MANUFACTURING PROCESS FOR MANUFACTURING ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL. MAY 9, 1972. AUS. 429948, BEL. 754323, CAN. 754323, FRA. 7028557, GER. 2038762, ITL. 902691, U.K. 1305298.

Class 18B

3,548,035.—SUSPENSION POLYMERIZATION PROCESS. DEC. 15, 1970. FRA. 1559138, GER. 1720782, JAP. 45-40052, U.K. 1185775.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.
3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.
3,697,266.—ORGANIC PHOTOCONDUCTIVE MATERIALS FOR ELECTROPHOTOGRAPHY. OCT. 10, 1972. BEL. 761043, CAN. 915493, FRA. 2074451, ITL. 913992, JAP. 48-38429, U.K. 1323109.
3,716,505.—PROCESS FOR SUSPENSION POLYMERIZATION. FEB. 13, 1973. FRA. 2048682, GER. 2025104, JAP. 47-23406, U.K. 1316693.

Class 18C

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.
3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 18C2A1

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 18C2A2

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.
3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

Class 18C5A

3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

Class 20A3

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430722, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.

Class 20B3

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20C

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

Class 20C2

3,753,466.—AUTOMATIC FIRE EXTINGUISHER IN ELECTROPHOTOGRAPHIC COPYING MACHINE OR THE LIKE. AUG. 21, 1973. U.K. 1334579.

Class 20C4

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 20D

3,653,292.—AUTOMATIC CONTOUR TRACING DEVICE. APR. 4, 1972. FRA. 7204547, GER. 2033094, U.K. 1295128.
3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 20D1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

Class 20G

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 20I

3,341,664.—METAL DRAWING APPARATUS. APR. 24, 1974.

Class 25A4

3,952,167.—ELECTROMAGNETIC COUPLER FOR USE WITH A TELEPHONE SET. APR. 20, 1976.

Class 25C2

3,341,631.—CIRCUIT INTERRUPTER. APR. 24, 1974. BEL. 764267, CAN. 932954, FRA. 7109086.
3,846,647.—TRIGGER CIRCUIT FOR USE WITH MULTIVIBRATORS. NOV. 5, 1974.

Class 25C4

3,838,344.—FREQUENCY MULTIPLYING CIRCUIT. SEPT. 24, 1974.

Class 25C5

3,936,675.—REFERENCE POINT POTENTIAL COMPENSATING CIRCUIT FOR USE WITH PHASE CONTROLLER. FEB. 3, 1976.

Class 27D

3,779,206.—APPARATUS FOR SCRAPING LIQUID OFF OF SHEET MATERIAL. DEC. 18, 1973.

Class 32

3,813,262.—RESIN-IMPREGNATED TISSUE OVERLAYS. MAY 28, 1974. BEL. 777312, FRA. 7146406, ITL. 945655.

Class 32B

3,273,450.—DATA PROCESSING APPARATUS. NOV. 15, 1963. FRA. 1384061, GER. 1449563, GRB. 1048048, JAP. 629392.

Xerox Patents

Class 1

4,043,549.—IMPACT FEEDER. AUG. 23, 1977
4,060,105.—TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER. NOV. 29, 1977
4,109,903.—FLUIDIC FEEDING OF DOCUMENTS TO AN EXPOSURE STATION. AUG. 29, 1978

Class 1A

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.
3,954,951.—PREPARATION OF RED AMORPHOUS SELENIUM. MAY 4, 1976.
3,961,954.—ACID SENSITIZED CHARGE TRANSFER COMPLEXES AND CYCLIC ELECTRSTATOGRAPHC IMAGNG METH-ACID SENSITIZATN. JUNE 8, 1976. CAN. 1002366.
4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,924.—IMAGING SURFACE SMOOTHING WITH ROUGHENED FOIL NICKEL. MAR. 14, 1978.
4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 1A 1

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.
3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.
3,928,036.—FLEXIBLE XEROGRAPHIC PHOTORECEPTOR ELEMENT. DEC. 23, 1975.
3,981,728.—XEROGRAPHIC IMAGING MEMBER HAVING HEXAGONAL SELENIUM IN INTER-LOCKING CONTINUOUS PATHS. SEPT. 21, 1971.

Class 1A 1A

3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
3,930,853.—ACCELERATING AGING METHOD FOR SELENIUM ARSENIC PHOTOCONDUCTORS. JAN. 6, 1976.
4,013,463.—PHOTORECEPTOR FABRICATION UTILIZING AC ION PLATING. MAR. 22, 1977.
4,150,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,109,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,072,518.—METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE. FEB. 7, 1978.
4,075,013.—ELECTROPHOTOCHEMICAL PREPARATION OF SELENIUM PHOTOCONDUCTIVE MEMBERS. FEB. 21, 1978.
4,098,655.—METHOD FOR FABRICATING A PHOTORECEPTOR. JULY 4, 1978.

Class 1A 1B

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,355,289.—CYCLICAL XEROGRAPHIC PROCESSD UTILIZING A SELENIUM-TELLURIUM XEROGRAPHIC PLATE. NOV. 28, 1967.
3,427,157.—XEROGRAPHIC PROCESS UTILIZING A PHOTOCONDUCTIVE ALLOY OF THALLIUM IN SELNIUM. FEB. 11, 1969. CAN. 0834085, FRA. 1461161, GRB. 1132993, HOL. 0150924, ITL. 0749553, JAP. 0534762, MEX. 0085232.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237, ITL. 0815227, JAP. 0632160.
3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.
3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.
3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.
3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
3,709,683.—INFRARED SENSITIVE IMAGE RETENTION PHOTORECEPTOR. JAN. 9, 1973.
3,874,917.—METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM. APR. 1, 1975.
4,015,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.
4,121,981.—ELECTROCHEMICAL METHOD FOR FORMING A SELENIUM-TELLURIUM LAYER IN A PHOTORECEPTOR. OCT. 24, 1978
4,126,457.—EVAPORATION TECHNIQUE FOR PRODUCING TEMPERATURE PHOTORECEPTOR ALLOYS. NOV. 21, 1978. CAN 1046864.

Class 1A 1C

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.
3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.
3,121,006.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964. ARG. 0147758, BEL. 0656892, CAN. 0674311, CHL. 0020455, CLB. 0014118, ECD. 0000029, GUA. 0001696, PRU. 0009656, TRK. 0012835, URG. 0006526, VZL. 0016353.
3,121,007.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,151,982.—XEROGRAPHIC PLATE. OCT. 6, 1964. ARG. 0149584, ATR. 0247148, AUS. 0275834, BEL. 0630478, BRA. 0088013, CAN. 0879017, DNK. 0116787, FRA. 1359402, GER. 1497054, GRB. 1049872, GRK. 0026268, HOL. 0139212, IND. 0086999, ISR. 0018877, ITL. 0701505, JAP. 0489512, LXB. 0043461, MEX. 0081663, NOR. 0108058, NZL. 0134420, PTG. 004070[illegible], SAF. 0001331, SPN. 0286492, STZ. 0450173, SWD. 0313998.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,519,420.—METHOD OF CHARGING A ZINC OXIDE PHOTOCONDUCTIVE LAYER WITH A POSITIVE CHARGE. JULY 7, 1970.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,941,594.—ELECTROPHOTOGRAPHIC ELEMENT WITH ZNO AND TIO2. MAR. 2, 1976.

3,969,113.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY CONTAINING TITANIUM OXIDE AND A CADMIUM PIGMENT. JULY 13, 1976.

3,975,306.—METHOD FOR IMPROVING THE PHOTOINDUCED DISCHARGE CHARACTERISTICS OF CERTAIN CADMIUM CHALOCOGENIDE. AUG. 17, 1976.

Class 1A 1E

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

Class 1A 1F

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,507,646.—ELECTROPHOTOGRAPHIC PROCESS USING A SINGLE PHASE PHOTOCONDUCTIVE GLASS IMAGING LAYER. APR. 21, 1970. ARG. 0164449, AUS. 0416137, BEL. 0691757, CAN. 0818383, FRA. 1511172, GER. 1522713, GRB. 1167520, ITL. 0787661, JAP. 0567233, MEX. 0105237, SPN. 0334896, STZ. 0472707, SWD. 0331793, VZL. 0024006.

3,565,713.—METHOD OF FORMING A CERAMIC IMAGE ON A CERAMIC SUBSTRATE. FEB. 23, 1971.

Class 1A 2

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 740836, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALIZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

4,043,812.—A PROCESS FOR PREPARATION OF 2-ANTHRYL & SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLY. JUL 23, 1977. BEL. 822305, FRA. 7527053, STZ. 32598.

4,050,934.—ELECTRON ACCEPTOR MONOMERS & POLYMERS. SEPT. 27, 1977.

4,056,391.—METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHO. NOV. 1, 1977.

4,117,072.—PROCESS FOR ENHANCEMENT OF MECHANICAL PROPERTIES OF PHOTOCONDUCTIVE POLYMERS. SEPT. 26, 1978. FRA. 7531736. GRB. 1469371.

4,117,239.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS & POLYMERS. SEPT. 26, 1978. BEL. 822305.

4,153,802.—ELECTRON ACCEPTOR MONOMERS AND POLYMERS. MAY 8, 1979. FRA. 7626102.

4,161,490.—ELECTRON ACCEPTOR MONOMERS. JULY 17, 1979. FRA. 7626102.

Class 1A 2A

3,081,165.—XEROGRAPHIC CHEMOGRAPHY. MAR. 12, 1963. CAN. 0618594, GRB. 0977904.

3,357,989.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-SEE D2167 FOR RE27117. DEC. 12, 1967. CAN. 0860929, FRA. 1508173, GRB. 1169901, ITL. 0787592, JAP. 0560090, MEX. 0101543.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODIOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,225.—ELECTROPHOTOGRAPHIC IMAGING PROCESS. MAY 20, 1969. CAN. 0846121.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. ATR. 0279351, AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,615,409.—ELCTROPHOTOGRPHC PLATE AND PROCESS EMPLOYING A PHOTODNDCTV PIGMNT OF GENERAL FORMULA R2 N4 S3. OCT. 26, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR.

0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,789,216.—PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE. JAN. 29, 1974.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 003956.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 740.307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,989,860.—REPAIR TECHNIQUE FOR PHOTORECEPTOR. NOV. 2, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE AND PROCESS. FEB. 1, 1977.

4,012,122.—LIQUID CRYSTALLINE PLATEN FOR A ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 15, 1977.

4,046,563.—PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYRENE, ARTICLE AND PROCESS OF USE. SEPT. 6, 1977. FRA. 7509147.

4,055,420.—SINGLE PHASE ORGANIC PHOTOCONDUCTIVE COMPOSITION. OCT. 25, 1977.

4,072,519.—PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT. FEB. 7, 1978. FRA. 7509146.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978. AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,122,114.—1-TRICYANOINYLPYRENE. OCT. 24, 1978.

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3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GER. 1522679, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT.29,1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,536,482.—ELECTROPHOTOGRPHC IMG SYS INCL A HALOGEN TREATMENT STOP FOR MAKING BCKGRND AREAS TRANSPARENT. OCT. 27, 1970.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 0033956.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1010430.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,062,886.—FLUORENONE CARBOXYLE ACID ESTERS. DEC. 13, 1977. FRA. 7621895.

4,069,046.—POLYMERIZED VINYL CARBAZOLES SENSITIZED BY NITRO-SUBSTITUTED 9-DICYANOMETHYLENE FLUORENES. JAN. 17, 1978.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978.

AUS. 462805, BFL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.

4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.

4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.

4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.

Class 1A 2C

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,961,948.—PHOTOCHROMIC IMAGING METHOD. JUNE 8, 1976.

Class 1A 2D

3,518,081.—IMAGE FORMATION AND DEVELOPMENT - REISSUED D 857R. JUNE 30, 1970. CAN. 0801270, GRB. 1085573.

RE29,357.—IMAGE FORMATION AND DEVELOPMENT—REISSUE OF 3,518,081—D 857. AUG. 16, 1977. CAN. 801270, GRB. 1085573.

Class 1A 3

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,723,110.—ELECTROPHOTOGRAPHIC PROCESS. MAR. 27, 1973.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

4,043656.—TRANSPARENCY COPYING MACHINE. AUG. 23, 1977.

Class 1A 4

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,816,115.—METHOD FOR FORMING A PLURALITY OF ELECTROSTATIC LATENT IMAGES ON AN ELECTROPHOTOGRAPHIC PLATE. JUNE 11, 1974.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1,010,430.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,063,943.—ELECTROSTATOGRAPHIC IMAGING METHOD. DEC. 20, 1977.

4,063,945.—ELECTROSTATOGRAPHIC IMAGING METHOD. DEC. 20, 1977.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978.AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

Class 1A 5

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLO. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,947,184.—IMAGING METHOD. MAR. 30, 1976.

3,972,718.—ELECTROSTATOGRAPHIC GRAVURE MEMBER. AUG. 3, 1976.

Class 1A 6

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,684,500.—METHOD OF FORMING PERMANENT ELECTROSTATIC IMAGE WITH TWO-LAYERED PHOTORECEPTOR. AUG. 15, 1972.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,994,791.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. NOV. 30, 1976.

4,049,449.—METHOD FOR FORMING AN ELECTROPHOTOGRAPHIC MEMBER. SEPT. 20, 1977.

Class 1B

3,730,453.—EARLY END-OF-TAPE DETECTION. MAY 1, 1973. CAN. 0939052, GRB. 1354581.

3,889,292.—APPARATUS FOR MAKING MULTIPLE ALPHANURMIC COPIES OF A BINARY CODED MESSAGE. JUNE 10, 1975. CAN. 0986572.

4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

4,076,858.—ELECTROSTATIC COPYING PROCESS WITH CHARGING OF THE ORIGINAL. FEB. 28, 1978.

Class 1B 1

3,244,546.—ELECTROSTATIC IMAGE REPRODUCTION. APR. 5, 1966. CAN. 0847532, GRB. 1040371, JAP. 0477223.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,518,698.—IMAGING SYSTEM. JUNE 30, 1970. CAN. 0905481, FRA. 1542838, GRB. 1200804, JAP. 0604154, MEX. 0099911.

3,561,957.—ELECTROPHOTOGRAPHIC PROCESS USING A HIGH INTENSITY ELECTROMAGNETIC RADIATION SOURCE. FEB. 9, 1971. CAN. 0914266, GRB. 1207361.
3,631,507.—METHOD OF REDISTRIBUTING CHARGE ON A DIELECTRIC MEDIUM. DEC. 28, 1971.
3,677,750.—PHOTOELECTROSOLOGRAPHIC IMAGING. JULY 18, 1972. GRB. 1326934.
3,686,678.—DUAL MODE ELECTROSTATIC PRINTING. AUG. 22, 1972. BEL. 0747125, CAN. 0952574, FRA. 7007650, GRB. 1297996, JAP. 0753534.
3,693,185.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. SEPT. 19, 1972.
3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973.
3,729,123.—PRINTING MACHINE AND METHOD. APR. 24, 1973. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,793,107.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. FEB. 19, 1974.
3,829,185.—HOUSING ASSEMBLY FOR ELECTROSTATIC PRINTING MACHINE. AUG. 13, 1974.
3,854,942.—TRANSPARENCY FOR MULTI-COLOR ELECTROSTATIC COPYING. DEC. 17, 1974.
3,859,960.—PRINTING MACHINE WITH ELECTROSTATIC WEB DEVELOPING APPARATUS. JAN. 14, 1975. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,937,177.—ELECTROSTATIC PRINTING MACHINE WITH IMPROVED TONER FOUNTAIN AND RECOVERY, FEB. 10, 1976 .
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.
4,042,939.—PRINTER/PLOTTER STYLE SYSTEM FOR CONFINED INSTALLATION AND METHOD. AUG. 16, 1977.

Class 1B 2

3,057,719.—PROCESS FOR FORMING ELECTROSTATIC IMAGES. OCT. 9, 1962. GRB. 0947039.
3,084,061.—METHOD FOR FORMATION OF ELECTROSTATIC IMAGE. APR. 2, 1963. CAN. 0607290.
3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGEFORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.
3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903 ITL. 0801906, JAP. 0537660.
3,551,146.—INDUCTION IMAGING SYSTEM. DEC. 29, 1970.
3,703,376.—INDUCTION SYSTEM. NOV. 21, 1972. ARG. 0190247, MEX. 0123032.
3,738,855.—INDUCTION IMAGING SYSTEM. JUNE 12, 1973.
3,778,841.—INDUCTION IMAGING SYSTEM. DEC. 11, 1973. ARG. 0190247, MEX. 0123032.
3,953,206.—IMAGING METHOD. APR. 27, 1976.
4,050,804.—LIQUID INK IMAGING SYSTEM. SEPT. 27, 1977.
4,056,314.—LIQUID INK IMAGING SYSTEM. NOV. 1, 1977.
4,076,405.—LIQUID INK IMAGING SYSTEM. FEB. 28, 1978.

Class 1B 3

3,145,655.—EQUIPOTENTIAL XEROPRINTING MEMBER AND PROCESS OF PRINTING THERE WITH. AUG. 25, 1964. CAN. 0784647, GER. 1287095, GRB. 0958964, JAP. 0591209.
3,160,091.—HIGH SPEED XEROPRINTER AND METHOD THEREFOR. DEC. 8, 1964. GRB. 0978349.
3,318,698.—XEROPRINTING REPRODUCTION. MAY 9, 1967. CAN. 0790236, FRA. 1394421, GRB. 1055323, ITL. 0801547, JAP. 0504497.
3,515,584.—XEROPRINTING MASTER. JUNE 2, 1970. CAN. 0882600, GRB. 1204246, JAP. 0659019.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0879118, JAP. 0713808.
3,967,818.—DUPLICATING SYSTEM. JULY 6, 1976.
4,047,945.—XEROPRINTING MASTER AND PROCESS. SEPT. 13, 1977.

Class 1B 4A

3,653,891.—FORMS OVERLAY TECHNIQUE USING TESI. APR. 4, 1972. ARG. 0184314, AUS. 0459354, BEL. 0761030, CAN. 0946912, FRA. 7047635, GRB. 1339714, ITL. 0913996, MEX. 0119467.
4,023,895.—ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 1B 4B

3,060,432.—ELECTROSTATIC RECORDING OF INFORMATION. OCT. 23, 1962.
3,064,259.—ELECTROSTATIC RECORDING OF INFORMATION. NOV. 13, 1962. CAN. 0736628.
3,068,481.—PROCESS AND APPARATUS FOR TESI-PRINTING. DEC. 11, 1962. CAN. 0709093, GRB. 0987234, JAP. 0446814.
3,091,762.—ELECTROSTATIC APPARATUS FOR MEASURING AND RECORDING TIME INTERVALS. MAY 28, 1963. CAN. 0620988, FRA. 1202341, GER. 1252149, GRB. 0880725, ITL. 0585388.
3,182,591.—IMAGE FORMING APPARATUS AND METHOD. MAY 11, 1965.
3,208,076.—ELECTROSTATIC PRINTER. SEPT. 21, 1965. GRB. 0999260.
3,217,330.—ELECTROSTATIC PRINTING UTILIZING PRINT-THROUGH RECORDING. NOV. 9, 1965. CAN. 0773752, GRB. 1001152.
3,234,359.—RECORD CARD SCANNING APPARATUS. FEB. 8, 1966.
3,234,904.—DEVICE FOR TESIPRINTING. FEB. 15, 1966. AUS. 0277492, CAN. 0804878, FRA. 1367728, GRB. 1024635, ITL. 0697883.
3,257,222.—ELECTROSTATIC RECORDING METHOD AND APPARATUS USING SHAPED ELECTRODES. JUNE 21, 1966. CAN. 0736231, GRB. 1027438, JAP. 0451019.
3,289,209.—ELECTROSTATIC MATRIX PRINTER. NOV. 29, 1966. CAN. 0707049, FRA. 1357858, GER. 1447873, GRB. 1018513, ITL. 0694321, JAP. 0440456.
3,342,126.—MULTIPLE ELECTROGRAPHIC PRINTER HAVING PLURAL UNITS CONNECTED TO COMMON DRIVE MEANS. SEPT. 19, 1967. CAN. 0825341, GRB. 1182685, JAP. 0648073.
3,348,232.—ASYNCHRONOUS PAGE-AT-A-TIME PRINTER. OCT. 17, 1967. CAN. 0709971, GRB. 1025487, JAP. 0462803.
3,358,592.—ELECTROGRAPHIC PRINTING. DEC. 19, 1967. CAN. 0896701, FRA. 1514749, GER. 1512401, GRB. 1182686, ITL. 0793834, MEX. 0098070.
3,430,254.—TESI PRINTING WITH FLEXIBLE ELECTRODE ON ENDLESS BELT. FEB. 25, 1969.
3,438,052.—AIR-SUPPORTED HOUSING CONTAINING TESI PRINTING DRUM. APR. 8, 1969. CAN. 0827330, GRB. 1149349.
3,495,269.—ELECTROGRAPHIC RECORDG METH AND APPRTS W/INERT GASEOUS DISCHARGE IONIZATION AND ACCELERATION GAPS. FEB. 10, 1970. ARG. 0174765, ATR. 0309208, AUS. 0413341, BEL. 0707986, CAN. 0865837, CZC. 0164808, FRA. 1551296, GRB. 1205790, ITL. 0819587, JAP. 0587936, MEX. 0103538, SPN. 0348328, SWD. 0346867, USR. 0291520.
3,599,225.—ELECTROSTATIC RECORDING APPARATUS - AIR GAP APERTURE BELT COMMUNICATIONS PRINTER. AUG. 10, 1971. CAN. 0882319, GRB. 1226436, JAP. 0675796.
3,644,930.—MULTI-STYLUS RECORDER. FEB. 22, 1972. ARG. 0181835, AUS. 0457379, BEL. 0751150, CAN. 0944812, CHL. 0025752, FRA. 7019463, GRB. 1297110, ITL. 0893693, MEX. 0119071, SPN. 0380273, SWD. 0368289, TIW. 0005822, VZL. 0027516.
3,673,600.—ELECTROGRAPHIC RECORDING METHOD AND APPARATUS. JUNE 27, 1972. CAN. 0947361, GRB. 1318605.
3,673,603.—RECIPROCATING CARRIAGE FOR ELECTROGRAPHIC PRINTING. JUNE 27, 1972. CAN. 0937629, GRB. 1346647.
3,686,676.—DUAL MODE ELECTROGRAPHIC RECORDER. AUG. 22, 1972. CAN. 0954293.
3,686,679.—MULTI-STYLUS RECORDING ASSEMBLY. AUG. 22, 1972.
3,714,665.—ELECTROSTATIC RECORDING WITH IMPROVED ELECTROSTATIC CHARGE RETENTION. JAN. 30, 1973.
3,717,880.—DUAL MODE ELECTROGRAPHIC RECORDING. FEB. 20, 1973. BEL. 0774564, CAN. 0948271, FRA. 7139638, GRB. 1366129, ITL. 0937674.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWD. 7216975.

3,771,184.—PRINTING APPARATUS. NOV. 13, 1973. CAN. 0973704, FRA. 7246858, GRB. 1415200, ITL. 0973321, SWD. 7216973.
3,795,010.—WRITING APPARATUS AND METHOD OF MANUFACTURE. FEB. 26, 1974.
3,806,238.—FORMS OVERLAY TECHNIQUE USING TEST. APR. 23, 1974.
3,811,766.—DEVELOPING APPARATUS. MAY 21, 1974. ARG. 0183333, AUS. 0446187, BEL. 0747127, CAN. 0879412, EGR. 0084803, FRA. 7008249, GRB. 1296417, ITL. 0898245, JAP. 0770134, MEX. 0112930, SPN. 0377301, STZ. 0521614, SWD. 0361749, TIW. 0006826, USR. 0352484.
3,875,578.—ENVELOPED STYLUS RECORDER. APR. 1, 1975. CAN. 0947360, FRA. 7008242, GRB. 1296416.
3,971,042.—WRITING APPARATUS AND METHOD OF MANUFACTURE. JULY 20, 1976.

Class 1C

4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.

Class 1C 1

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,437,020.—MICROFILM TITLING APPARATUS. APR. 8, 1969. CAN. 0837780, GRB. 1191019, JAP. 0572188.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 6872518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.
4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

Class 1C 2

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.
3,379,106.—XEROGRAPHIC REPRODUCTION APPARATUS. APR. 23, 1968. ATR. 0300567, AUS. 0416116, BEL. 0674602, CAN. 0821718, DNK. 0117045, FRA. 1475712, GRB. 1135742, ITL. 0750206, MEX. 0095580, SPN. 0321099, STZ. 0509924, SWD. 6912065.
3,480,360.—XEROGRAPHIC COPYING APPARATUS. NOV. 25, 1969. ARG. 0180571, ATR. 0301344, AUS. 0310556, BEL. 0704978, CAN. 0870794, CHL. 0023569, FRA. 1540839, GRB. 1206964, GRK. 0035147, HUN. 0158496, IND. 0112715, ITL. 0827017, LXB. 0054635, MEX. 0102269, NZL. 0156632, PRU. 0009341, PTG. 0048460, SAF. 0676065, SPN. 0345998, STZ. 0487439, SWD. 0337743, URG. 0008847, VZL. 0023675.
3,592,539.—RECORDING APPARATUS. JULY 13, 1971. CAN. 0917230.
3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 3

3,130,411.—ELECTRONIC RECORDER. APR. 21, 1964. CAN. 0729326.
3,212,888.—METHOD FOR DEVELOPING LATENT ELECTROSTATIC CHARGE HALFTONE IMAGES. OCT. 19, 1965. GER. 1284302, GRB. 1017683, JAP. 0470423.
3,281,857.—XEROGRAPHIC TRANSFER PLATEN. OCT. 25, 1966. CAN. 0733683, GRB. 1025199.
3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.
3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.
3,873,310.—METHOD OF CONTROLLING THE BRIGHTNESS ACCEPTANCE RANGE AND TONAL CONTRAST OF XEROGRAPHIC PLATE. MAR. 25, 1975. GRB. 1414951.
3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975. GRB. 1459558.
3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975. GRB. 1459558.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.
4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.
4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23, 1977.
4,051,536.—ELECTRONIC HALFTONE IMAGING SYSTEM. SEPT. 27, 1977.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.
4,072,414.—SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 7, 1978.
4,080,055.—A HALF-TONE COLOR COPIER. MAR. 21, 1978.
4,083,632.—MULTI FREQUENCY SCREEN. APR. 11, 1978.
4,090,786.—MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. MAY 23, 1978.
4,095,889.—EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 20, 1978.
4,108,654.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A DOCUMENT SCREEN. AUG. 22, 1978. FRA. 7514227. GRB. 1490898.
4,130,841.—VARIABLE FREQUENCY HALF-TONE IMAGING APPARATUS. DEC. 19, 1978.
4,149,183.—ELECTRONIC HALFTONE GENERATOR. APR. 10, 1979.
4,149,194.—VARIABLE ANGLE ELECTRONC HALFTONE SCREENING. APR. 10, 1979.

Class 1C 4

3,196,009.—ELECTROSTATIC IMAGE LIQUID DEFORMATION DEVELOPMENT. JULY 20, 1965. ATR. 0267320, AUS. 0273895, BEL. 0631984, CAN. 0768329, DNK. 0129676, FRA. 1408156, GER. 1497058, GRB. 1043981, HOL. 0134043, ISR. 0019144, ITL. 0695213, JAP. 0620918, LXB. 0043704, MEX. 0080571, NOR. 0123260, SAF. 0001947, STZ. 0448745, SWD. 0315502.
3,196,010.—ELECTROPHOTOGRAPHIC PROCESS FOR FORMATION OF DEFORMATION IMAGES IN DEFORMABLE INTERFERENCE FILM. JULY 20, 1965. CAN. 0790232, FRA. 1364100, GRB. 1036738, ITL. 0695214, JAP. 0510166.
3,196,012.—HALF-TONE XEROGRAPHY WITH THERMOPLASTIC DEFORMATION OF THE IMAGE. JULY 20, 1965. CAN. 0760623, FRA. 1359565, GER. 1497060, GRB. 1040836, ITL. 0697483, JAP. 0478444.
3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.
3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.
3,419,885.—IMAGE DEVELOPMENT OF THERMOPLASTIC LAYERS. DEC. 31, 1968. CAN. 0785985, GRB. 1117644, JAP. 0537663.
3,436,216.—IMAGE STORAGE COMPRISING A THERMOPLASTIC DEFORMATION PATTERN. APR. 1, 1969. CAN. 0807326, FRA. 1488094, GRB. 1160731, ITL. 0774940.
3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.
3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.
3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,698,892.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. OCT. 17, 1972. CAN. 0949117, GRB. 1343191.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,716,359.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. FEB. 13, 1973. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,719,483.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. MAR. 6, 1973.

3,730,621.—CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM. MAY 1, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,842,406.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. OCT. 15, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,858,973.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. JAN. 7, 1975. CAN. 0949117, GRB. 1343191.

3,888,591.—IMAGE SUBTRACTION APPARATUS. JUNE 10, 1975.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,433.—PHASE IMAGE SCANNING METHOD. MAR. 23, 1976. BEL. 0835551.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,961,950.—IMAGING SYSTEM. JUNE 8, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

3,999,988.—METHOD FOR REAL-TIME COLOR MASKING. DEC. 28, 1976.

4,018,603.—DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS. APR. 19, 1977.

4,021,236.—IMAGING SYSTEM. MAY 3, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,065,308.—DEFORMATION IMAGING ELEMENT. DEC. 27, 1977.

4,079,421.—IMAGE SCANNING SYSTEM. MAR. 14, 1978.BEL. 835551, SPN. 442965.

Class 1C 4A

3,196,008.—ELECTROPC PRCS FOR FRMTN OF FRST LIKE DEFRMTN IMGS IN MECHANICALLY DEFRMBL PHOTOCONDUCTIVE LAYER. JULY 20, 1965. CAN. 0844221.

3,196,011.—ELECTROSTATIC FROSTING. JULY 20, 1965. ARG. 0150575, ATR. 0256625, AUS. 0275848, BEL. 0631983, BRA. 0082433, CAN. 0918226, CHL. 0019655, EIR. 0027268, FIN. 0044982, FRA. 1364101, GER. 1295371, GRB. 1039881, GRK. 0026981, HOL. 0140635, IND. 0087685, ISR. 0019143, ITL. 0695215, LXR. 0043693, MEX. 0102124, NOR. 0118346, NZL. 0134799, PAK. 0114430, PLP. 0003269, PTG. 0040894, SAF. 0001948, SPN. 0292129, STZ. 0425467, SWD. 0315201, TRK. 0011937, UAR. 0004997, VTM. 0000992, VZL. 0014488.

3,213,429.—HIGH SPEED INFORMATION RECORDER. OCT. 19, 1965.

3,258,336.—STRIPPABLE LAYER FROST PRINTING. JUNE 28, 1966. CAN. 0815184.

3,322,034.—FROST COLOR DISPLAY. MAY 30, 1967.

3,329,500.—ELECTROSTATIC FROSTING. JULY 4, 1967.

3,482,969.—FIXING OF DEFORMATION IMAGES. DEC. 9, 1969. CAN. 0801883, FRA. 1399003, GRB. 1061235, ITL. 0726200, SWD. 0315806.

3,485,623.—CONTINUOUS TONE THERMOPLASTIC PHOTOGRAPHY. DEC. 23, 1969. CAN. 0810834, GRB. 1181093, JAP. 0565795.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,560,205.—METHOD OF FORMING A PHASE MODULATING HOLOGRAM ON A DEFORMABLE THERMOPLASTIC. FEB. 2, 1971. CAN. 0949793, GRB. 1162853.

3,560,206.—PRODUCTION OF LATENT PERODIC MEMORY PATTERNS IN FROSTABLE FILMS. FEB. 2, 1971.

3,561,958.—INDUCING FROST DEFORMATION IMAGING BY ELECTROLYTIC DEPOSITION. FEB. 9, 1971.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,764,311.—IMAGING SYSTEM. OCT. 9, 1973.

3,819,369.—SURFACE DEFORMABLE IMAGING MEMBER OF IMPROVED DARK DECAY CHARACTERISTICS. JUNE 25, 1974.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

Class 1C 4B

3,238,041.—RELIEF IMAGING OF PHOTORESPONSIVE MEMBER AND PRODUCT. MAR. 1, 1966. CAN. 0850841, GRB. 1043983, MEX. 0080410.

3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,615,388.—DEFORMATION IMAGING PROCESS AND ELEMENT. OCT. 26, 1971. CAN. 0941877, MEX. 0101539.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 5

3,519,818.—METHOD OF PREPARING A NEGATIVE XEROGRAPHIC REPRODUCTION FROM A POSITIVE LINE COPY IMAGE. JULY 7, 1970. CAN. 0829037, GRB. 1191159, JAP. 0589516.

Class 1D

3,318,212.—DUPLEX XEROGRAPHIC REPRODUCTION. MAY 9, 1967.

3,506,347.—DUPLEX XEROGRAPHIC REPRODUCTION APPARATUS. APR. 14, 1970.

3,536,398.—REPRODUCTION APPARATUS. OCT. 27, 1970. AUS. 0442047, BEL. 0737274, CAN. 0899443, EGR. 0091200, FRA. 6927759, GRB. 1246226, ITL. 0883645, SPN. 0370416, STZ. 0500517, SWD. 0356144, TIW. 0005358, USR. 0359871.

3,580,670.—APPARATUS FOR DUPLEXING. MAY 25, 1971. CAN. 0929581.

3,615,129.—DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH COPY SHEET REVERSING STATION. OCT. 26, 1971. ARG. 0172601, AUS. 0432830, BEL. 0737341, CAN. 0909853, CZC. 0158650, EGR. 0083299, FRA. 6927784, GRB. 1256767, ITL. 0883644, JAP. 0774495, MEX. 0108784, SPN. 0370415, STZ. 0500518, SWD. 0356143, TIW. 0006822, USR. 0371736, VZL. 0032923.

3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.

3,674,475.—ENCLOSED MIGRATION IMAGING SYSTEM. JULY 4, 1972.

3,694,073.—METHOD FOR DUPLEXING. SEPT. 26, 1972.
3,754,822.—SCANNING SYSTEM. AUG. 28, 1973.
3,844,653.—ROOF MIRROR COPYING SYSTEM. OCT. 29, 1974.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.
3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.
3,936,171.—ELECTROSTATOGRAPHIC METHODS AND APPARATUS. FEB. 3, 1976.
3,940,210.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. FEB. 24, 1976. BEL. 0832356, IRN. 0013436.
3,944,359.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. MAR. 16, 1976.
4,014,609.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINE. MAR. 29, 1977.
4,035,073.—DUPLEX REPRODUCTION MACHINE. JULY 12, 1977. BEL. 0832115, SPN. 0440012.
4,104,726.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. AUG. 1, 1978.
4,107,779.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. AUG. 15, 1978.
4,109,313.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. AUG. 22, 1978.
4,116,558.—DUPLEX SYSTEM AND METHOD FOR PRECOLLATION COPIERS. SEPT. 26, 1978.
4,120,034.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. OCT. 10, 1978.
4,131,360.—DUPLEX REPRODUCTION SYSTEM EMPLOYING COPY SHEET CLEANER. DEC. 26, 1978.

Class 1E

3,057,720.—XEROGRAPHIC COLOR REPRODUCTION. OCT. 9, 1962. GRB. 0956772.
3,227,549.—MULTIPLE IMAGE FORMING XEROGRAPHIC REPRODUCTION PROCESS. JAN. 4, 1966.
3,313,623.—LINE SEQUENTIAL COLOR XEROGRAPHY. APR. 11, 1967. CAN. 0880483, GRB. 1019974.
3,316,805.—COLOR DISPLAY. MAY 2, 1967.
3,357,830.—DYED IMAGE XEROGRAPHY. DEC. 12, 1967. CAN. 0821484, GER. 1277018, GRB. 1016581, ITL. 0679720, JAP. 0477809.
3,373,091.—DATA STORAGE DEVICE AND METHOD. MAR. 12, 1968.
3,386,379.—DUPLICATING WITH COLOR PRODUCING REAGENTS. JUNE 4, 1968. AUS. 0294747, CAN. 0842445, FRA. 1390006, GER. 1249089, GRB. 1043875, ITL. 0801548, JAP. 0611643.
3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.
3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,583,806.—DYED IMAGE XEROGRAPHY. JUNE 8, 1971.
3,615,392.—ELECTROPHORETIC REPRODUCTION ORIGINAL CONTAINING BOTH MULTI-COLOR AND LINE AREAS. OCT. 26, 1971.
3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972.
3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 0932785.
3,690,756.—COLOR XEROGRAPHY. SEPT. 12, 1972. BEL. 0781001, CAN. 0963522, FRA. 7210584, GRB. 1365753, ITL. 0950399.
3,702,483.—COLOR RENDITION METHOD. NOV. 7, 1972. BEL. 0777015, CAN. 0935334, FRA. 7146255, GRB. 1361647, ITL. 0944210.
3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.
3,724,943.—COLOR REPRODUCTION APPARATUS. APR. 3, 1973. CAN. 0946463.
3,734,607.—COLOR REPRODUCTION APPARATUS. MAY 22, 1973. ARG. 0184654, ATR. 0314352, AUS. 0459724, BEL. 0751490, CAN. 0946462, CHL. 0026265, DNK. 0130156, EGR. 0085001, FRA. 7020455, GRB. 1316499, ITL. 0893863, MEX. 0120285, NZL. 0160302, PNM. 0002259, PTG. 0053890, SAF. 0703775, SPN. 0380376, STZ. 0514164, SWD. 0359176.
3,799,668.—COLOR STANDARD AND METHOD OF CALIBRATING A MULTI-COLOR ELECTROPHOTGRAPHIC PRINTING MACHINE. MAR. 26, 1974. BEL. 0812179, SAF. 0741562.
3,799,774.—MULTI COLOR ELECTROPHOTOGRAPHIC MASKING PROCESS. MAR. 26, 1974.
3,805,283.—CHART CREATION APPARATUS. APR. 16, 1974.
3,869,203.—COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 4, 1975. BEL. 0820041.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,909,127.—MULTI-COLOR ORIGINAL FOR AN ELECTROPHOTOGRAPHIC PRINTING SYSTEM. SEPT. 30, 1975.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,936,182.—CONTROL ARRANGEMENT FOR AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS. FEB. 3, 1976.
3,944,711.—TRANSPARENCY. MAR. 16, 1976.
3,958,990.—TRANSFERRING TONER TO AN AMINE COATED SHEET. MAY 25, 1976.
3,960,445.—COLOR HIGHLIGHTING ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,963,341.—A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 15, 1976.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,999,987.—COLOR REPRODUCTION METHOD. DEC. 28, 1976.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,696.—MULTICOLORED XEROGRAPHIC TRANSPARENCY UTILIZING AN APIPHATIC ESTER COATING. MAR. 29, 1977.
4,027,962.—COLOR TRANSPARENCY REPRODUCING MACHINE. JUNE 7, 1977. BEL. 0830321, IRN. 0013435, SPN. 0437814.
4,040,828.—MULTICOLOR IMAGING METHOD AND IMAGED MEMBER EMPLOYING COMBINATION OF TRANSPARENT TONER AND. AUG. 9, 1977. FRA. 7540219.
4,045,218.—METHOD FOR ELECTROSTATICALLY PRODUCING A COLOR ACCENTED PHOTOCOPY. AUG. 30, 1977.
4,045,219.—METHOD OF REPRODUCING COLOR HIGHLIGHTED DOCUMENTS. AUG. 30, 1977.
4,053,216.—COLOR TRANSPARENCY REPRODUCING MACHINE. OCT. 11, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,053,217.—COLOR TRANSPARENCY REPRODUCING MACHINE. OCT. 11, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,058,850.—PROGRAMMABLE CONTROLLER. NOV. 15, 1977.
4,063,810.—COLOR TRANSPARENCY REPRODUCING MACHINE. DEC. 20, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,063,946.—ELECTROPHOTOGRAPHIC COLOR REPRODUCTION PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIAL WITH DUAL. DEC. 20, '977.
4,068,938.—ELECTROSTAIC COLOR PRINTING USING DISCRETE POTENTIALS. JAN. 17, 1978. GRB. 1442234.
4,068,939.—COLOR TRANSPARENCY REPRODUCING MACHINE. JAN. 17, 1978. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,929.—METHOD FOR TWO-COLOR DEVELOPMENT OF A XERIOGRAPHIC CHARGE PATTERN. MAR. 14, 1978.
4,082,443.—SYSTEM FOR SUPERPOSITION OF COLOR SEPARATION IMAGES. APR. 4, 1978.
4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.
4,097,139.—REPRODUCING MACHINE HAVING INTERCHANGEABLE DEVELOPER HOUSINGS. JUNE 27, 1978.
4,111,542.—COLLATING SYSTEM FOR OPAQUE DOCUMENTS AND SLIDE REPRODUCTIONS. SEPT. 5, 1978.
4,135,927.—MULTICOLOR XEROGRAPHIC PROCESS. JAN. 23, 1979. ARG. 188730. AUS. 459398. BEL. 767360. CAN. 946910. CHL. 26754. DNK. 133524 . FRA. 7118951. GRB. 1345391. ITL. 930586. MEX. 121678. PNM. 2395. SPN. 391274. STZ. 530659. SWD. 358245. TIW. 8520. VZL. 32422.

Class 1F

3,109,366.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624372.
3,109,367.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624374, FRA. 1146623, GER. 1029837, GRB. 0813637.
3,143,066.—PRODUCTION OF DUPLICATING MASTERS. AUG. 4, 1964. CAN. 0722954.

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.

3,455,240.—IMAGING SYSTEM. JULY 15, 1969. CAN. 0823599, GER. 1571913, GRB. 1165676, JAP. 0594700.

3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794, VZL. 0024009.

3,490,368.—PRINTING BY PARTICULATE IMAGES. JAN. 20, 1970. ARG. 0152222, ATR. 0281875, AUS. 0403243, BEL. 0674293, BRA. 0086720, CAN. 0824922, DNK. 0117303, FIN. 0047145, FRA. 1464987, GER. 1496169, GRB. 1128173, GRK. 0031516, HOL. 0145056, ITL. 0750153, JAP. 0547199, MEX. 0101075, NOR. 0130551, SAF. 0656968, SPN. 0321274, STZ. 0446906, SWD. 0355681, VZL. 0023998.

3,549,447.—IMAGING SYSTEM. DEC. 22, 1970.

3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.

3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.

3,615,128.—APPARATUS FOR ELECTROSTATIC PRINTING. OCT. 26, 1971. CAN. 0910956.

3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.

3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.

3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.

3,919,938.—PERMANENT ELECTROSTATIC MASTER. NOV. 18, 1975.

4,006,267.—COLOR HIGHLIGHTING PROCESS. FEB. 1, 1977.

4,068,588.—PRINTING USING AN ELECTROCHROMIC IMAGE. JAN. 17, 1978.

Class 1G 1

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

3,124,457.—DIFFERENTIAL IMAGE TRANSFER SYSTEM. MAR. 10, 1964. CAN. 0800184, GRB. 1031986, JAP. 0477375.

3,185,777.—MAGNETIC RECORDING. MAY 25, 1965.

3,485,621.—RECORDING BY PARTICLE ORIENTATION. DEC. 23, 1969. CAN. 0916777, GRB. 1188982, JAP. 0582501.

3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.

3,803,638.—RECORDING SYSTEM USING MAGNETIC CORE MATRIX. APR. 9, 1974.

3,875,576.—ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER. APR. 1, 1975.

4,160,046.—METHOD OF MAKING AN IMAGING SYSTEM. JULY 3, 1979.

Class 1G 2

3,592,642.—DUPL METH PAPR SHT HTS MELTG PT TONR IMG SIMUL CAUSE TRANSF TNR FRPHOTOCNDCR AND FSG TNR IMG ON PAP. JULY 13, 1971. BEL. 0706852, FRA. 1547828, GRB. 1198306, HUN. 0157321, ITL. 0815498.

Class 1G 3

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.

3,438,772.—IMG RPDCTN INVLVNG ELCTROSTC TRSF OF RELESBL DONR FILM FRM PTOCNDTV INSLTNG LAYER TO ADHSV TRS. APR. 15, 1969. CAN. 0838044, GRB. 1124954, JAP. 0542587.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

Class 1G 4

3,166,418.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0747566, FRA. 1259438, GER. 1190334, GRB. 0952609, JAP. 0418117.

3,619,054.—OIL FILM IMAGING APPARATUS. NOV. 9, 1971.

Class 1G 5

3,234,019.—METHOD FOR FORMATION OF AN ELECTROSTATIC IMAGE RESISTANT TO DETERIORATION ON STORAGE. FEB. 8, 1966. ATR. 0248873, AUS. 0266424, BEL. 0618720, FRA. 1325903, GER. 1295374, GRB. 1006231, IND. 0081730, ISR. 0017057, ITL. 0667262, SAF. 0001489, STZ. 0407176, SWD. 0307733.

Class 1G 6

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.

3,924,945.—APPARATUS FOR INDUCTIVE IMAGING WITH SIMULTANEOUS POLAR INK DEVELOPMENT. DEC. 9, 1975.

3,974,554.—QUANDRANGULAR TRIPETICORD GRAVURE ROLL. AUG. 17, 1976.

3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.

3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.

4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.

4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.

4,020,788.—DOCTORING MEANS. MAY 3, 1977.

4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537.

4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 1H 1

3,100,427.—PROJECTION DEVICE. AUG. 13, 1963.

3,166,419.—IMAGE PROJECTION. JAN. 19, 1965. CAN. 0699802, FRA. 1260843, GRB. 0955994.

3,166,420.—SIMULTANEOUS IMAGE FORMATION. JAN. 19, 1965. CAN. 0756267, GRB. 0955142.

3,185,050.—XEROGRAPHIC IMAGE PROCESSOR PROJECTOR. MAY 25, 1965.

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.

3,220,012.—SIMULTANEOUS RECORDING AND DISPLAY SYSTEM. NOV. 23, 1965. CAN. 0809339, FRA. 1373673, GER. 1303156, GRB. 1019900, ITL. 0695895, JAP. 0470425.

3,317,317.—XEROGRAPHIC METHOD OF MAKING A PARTICLE TRANSPARENCY PROJECTIBLE IMAGE. MAY 2, 1967.

3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.

3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.

3,519,344.—IMAGE PROJECTION. JULY 7, 1970.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

3,593,832.—KEYBOARD INPUT DISPLAY DEVICE. JULY 20, 1971.

3,619,049.—XEROGRAPHIC IMAGERY USING A LONG PERSISTENCE PHOSPHOR INTERMEDIATE. NOV. 9, 1971.

3,955,977.– ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1H 2

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.

3,512,038.—PIN SYSTEM. MAY 12, 1970. CAN. 0873507, GRB. 1201497, JAP. 0623001.

Class 11

3,414,409.—PARTICLE TRANSFER. DEC. 3, 1968. BEL. 0713399, CAN. 0822324, FRA. 1568374, GRB. 1145026, ITL. 0829803.

3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.

3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.

3,784,301.—ELECTROPHOTOGRAPHIC METHOD. JAN. 8, 1974.

3,883,349.—ELECTROPHOTOGRAPHIC CHARGING METHOD. MAY 13, 1975.

3,973,846.—ELECTROSTATIC MASTER MAKING APPARATUS. AUG. 10, 1976.

4,021,112.—PHOTORECEPTOR DARK CURRENT LEAKAGE DETECTING APP FOP XEROGRAPHIC MACHINES. May 3, 1977.

4,039,831.—TWO COLOR XERORADIOGRAPHY DEVELOPMENT. AUG. 2, 1977.

4,134,137.—SINGLE WIRE MICROELECTROMETER IMAGING SYSTEM. JAN. 9, 1979.

Class 1J

3,652,156.—LINEAR-TO-DRUM OPTICAL SCAN CONVERTER SYSTEM. MAR. 28, 1972.

3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWC. 7216975.

3,954,463.—METHOD FOR ELECTROSTATIC PRINTING. MAY 4, 1976.

4,046,472.—ELECTROSTATIC IMAGING APPARATUS. SEPT. 6, 1977.

4,103,995.—IMAGING APPARATUS. AUG. 1, 1978.

Class 1J 1

3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.

3,062,109.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 6, 1962. ARG. 0149705, CAN. 0683779, CHL. 0024545, CLB. 0014851, COS. 0001435, FRA. 1291840, GER. 1290817, GRB. 0995414, GUA. 0001694, HGK. 0022168, ITL. 0646249, JAP. 0444672, KEN. 0167268, PNM. 0002135, PRU. 0008376, URG. 0007955, VZL. 0017266.

3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.

3,099,943.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 6, 1963. ADN. 0000468, ARG. 0169828, ATR. 0251420, AUS. 0270773, BEL. 0629050, BRA. 0082981, BRS. 00J3736, BRU. 0000369, CAN. 0738132, CHL. 0023724, CLB. 0015207, COS. 0001436, ECD. 0000022, FIJ. 0000340, FRA. 1346575, GHA. 0000997, GIB. 1032951, GIE. 0006569, GRB. 1032951, GRK. 0025939, GUA. 0001740, GUR. 1032951, HGK. 0008969, IND. 0086614, ISR. 0018757, ITL. 0752146, JAP. 0491155, JER. 0000P97, KEN. 0001743, LXB. 0043231, MAU. 1897571, MEX. 0074814, MLS. 0014969, NIG. 0001617, NOR. 0124476, NZL. 0134238, PRU. 0008375, PTG. 0040583, SAF. 0063737, SBH. 0005169, SGP. 0008069, SHL. 0000016, SLN. 1677286, SPN. 0286059, SRK. 0000387, STZ. 0425469, SWD. 0323285, UGD. 0000169, URG. 0007713, VZL. 0017049.

3,131,617.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 5, 1964.

3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.

3,146,688.—XEROGRAPHIC MACHINE. SEPT. 1, 1964. ATR. 0249503, AUS. 0272158, BEL. 0616948, CAN. 0712269, FRA. 1324504, GER. 1295372, GRB. 1009867, JAP. 0464921.

3,182,573.—MASKED PLATE XEROGRAPHY. MAY 11, 1965. CAN. 0859657, FRA. 1353685, GRB. 1021882, ITL. 0694073, JAP. 0470242.

3,205,484.—ELECTROSTATIC MEMORY SYSTEM. SEPT. 7, 1965.

3,355,983.—CARD HANDLING MECHANISM. DEC. 5, 1967. CAN. 0814086, MEX. 0113373.

3,514,201.—RECORDING APPARATUS. MAY 26, 1970. CAN. 0880484.

3,520,602.—GRAPHIC DISPLAY DEVICE. JULY 14, 1970. CAN. 0838312.

3,536,395.—TRANSACTION RECORDING APPARATUS AND SYSTEM. OCT. 27, 1970. CAN. 0870184, GRB. 1213825.

3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.

3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.

3,770,430.—PHOTOELECTROSCLOGRAPHIC IMAGING PROCESS. NOV. 6, 1973.

3,865,482.—ELECTROSTATOGRAPHIC COPYING MACHINE. FEB. 11, 1975.

3,917,396.—CONTROL SYSTEM. NOV. 4, 1975.

3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

3,976,374.—ELIMINATION OF REDUNDANT IMAGE. AUG. 24, 1976. GRB. 1419725.

3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.

RE29,514.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. JAN. 10, 1978.

4,046,472.—ELECTROSTATIC IMAGING APPARATUS. SEPT. 6, 1977.

4,054,380.—CONTROL SYSTEM FOR HIGH SPEED COPIER/DUPLICATORS. OCT. 18, 1977. GRB. 1491911.

4,093,367.—IMAGING APPARATUS. JUNE 6, 1978.

4,103,995.—IMAGING APPARATUS. AUG. 1, 1978.

4,122,996.—COPY REPRODUCTION MACHINE WITH CONTROLLER SELF CHECK SYSTEM. OCT. 31, 1978.

4,124,287.—IMAGING SYSTEM UTILIZING UNCHARGED MARKING PARTICLES. NOV. 7, 1978.

4,125,325.—AUTOMATIC DUPLEX CONTROL SYSTEM FOR A REPRODUCTION MACHINE. NOV. 14, 1978. BEL. 870043.

4,130,354.—REPRODUCTION MACHINE HAVING DUPLEX JOB RECOVERY CAPABILITIES. DEC. 19, 1978. BEL. 870038.

4,149,487.—XEROGRAPHIC MACHINE WITH INFINITELY VARIABLE DEVELOPER BIAS. APR. 17, 1979.

4,153,241.—DOUBLE DOCUMENT FEED DETECTION FOR A DOCUMENT HANDLER IN A REPRODUCTION MACHINE. MAY 8, 1979. BEL. 870041.

4,156,133.—REPRODUCTION MACHINE WITH PAPER PATH DETECTION DIAGNOSTICS. MAY 22, 1979. BEL. 870040.

4,158,886.—OPERATOR CONSOLE FOR A REPRODUCTION MACHINE. JUNE 19, 1979. BEL. 870041.

4,161,277.—IMPROPER COPY RUN PROGRAM ENTRY CHECK FOR ELECTROSTATIC TYPE REPRODUCTION OR COPYING MACHINE. JULY 17, 1979.

4,162,844.—REPRODUCTION MACHINE WITH DUPLEX IMAGE SHIFT. JULY 31, 1979. BEL. 870037.

Class 1J 2

3,057,275.—IMAGE KEEPING. OCT. 9, 1962.

3,185,051.—XEROGRAPHIC METHOD. MAY 25, 1965. CAN. 0740113, FRA. 1385444, GRB. 1026557, ITL. 0712017.

3,237,197.—IMAGE METHOD FOR ELECTROSTATIC RETENTION IN PHOTOCONDUCTIVE LAYERS. FEB. 22, 1966.

Class 1J 3

3,105,426.—XEROGRAPHIC APPARATUS. OCT. 1, 1963. CAN. 0689214, FRA. 1290414, GER. 1297476, GRB. 0989487, JAP. 0626117.

3,132,206.—HIGH SPEED PRINTING APPARATUS. MAY 5, 1964. GRB. 0999043.

3,649,114.—MULTIPLE OUTPUT ELECTROSTATIC RECORDING SYSTEM. MAR. 14, 1972. ARG. 0200567, AUS. 0447901, CAN. 0923542, NZL. 0160104.

Class 1J 4

3,148,601.—XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 15, 1964.

3,187,651.—XEROGRAPHIC REPRODUCING APPARATUS. JUNE 8, 1965. FRA. 1338861, GER. 1797533, GRB. 1015633, HGK. 0013368, JAP. 0441423, KEN. 0167368.

3,196,767.—DOCUMENT COPY MECHANISM. JULY 27, 1965. CAN. 0731929, GRB. 1032953, JAP. 0651995.

3,399,610.—XEROGRAPHIC APPARATUS. SEPT. 3, 1968. CAN. 0819923.

3,788,203.—JUSTIFICATION APPARATUS. JAN. 29, 1974. CAN. 0989929, GRB. ♪ 380831.

3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976.

4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.

4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,053,221.—MULTI-MODE REPRODUCING APPARATUS. OCT. 11, 1977.

Class 1J 5

3,083,869.—XEROGRAPHIC PLATE MAGAZINE AND FEEDING APPARATUS. APR. 2, 1963.
3,091,160.—XEROGRAPHIC PLATE FEEDING AND SUPPORTING APPARATUS. MAY 28, 1963.
3,160,057.—XEROGRAPHIC PROCESSING APPARATUS. DEC. 8, 1964.
3,272,101.—XEROGRAPHIC APPARATUS. SEPT. 13, 1966.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 1J 6

RE.27,776.—ROLLER ASSEMBLY FR BELT-TYPE PHOTORECEPTR IN ELECTROSTATC PRNTNG MACHINES—RE OF D1480—3,536. OCT. 9, 1973.
3,190,199.—XEROGRAPHIC COPYING APPARATUS. JUNE 22, 1965. CAN. 0709970, GRB. 1033834, JAP. 0477813.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,536,323.—BELT ASSEMBLY—REISSUED D3492—27,776. OCT. 27, 1970. ARG. 0181307, AUS. 0437364, BEL. 0733405, BRA. 6909127, CAN. 0943179, FRA. 6917082, GRB. 1275135, HUN. 0157763, ITL. 0869475, JAP. 0700616, MEX. 0112302, PNM. 0001817, SPN. 0367615, STZ. 0506819, TIW. 0UM5646, USR. 0406385, VZL. 0025831.
3,661,452.—XEROGRAPHIC REPRODUCTION MACHINE. MAY 9, 1972. ARG. 0169621, AUS. 0442749, BEL. 0733407, CAN. 0910959, CHL. 0024800, DNK. 0125257, FRA. 6917084, GRB. 1264406, ITL. 0877771, MEX. 0115542, PNM. 0001759, PRU. 0010640, SPN. 0367613, STZ. 0491418, TIW. 0006498, USR. 0358875, VZL. 0026279.
3,664,204.—BELT ASSEMBLY FOR USE IN AN ELECTROSTATIC PRINTING MACHINE. MAY 23, 1972. ARG. 0193980, BEL. 0777322, CAN. 0939735, FRA. 7147893, GRB. 1372389, ITL. 0944437, MEX. 0128274, VZL. 0032791.
3,730,623.—VACUUM HOLDDOWN DEVICE FOR MOVING BELTS. MAY 1, 1973. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,790,271.—PROCESSING CONTROL SYSTEM FOR PRINTING MACHINES. FEB. 5, 1974. CAN. 0986173, SPN. 0418256.
3,801,092.—VACUUM HOLD-DOWN DEVICE FOR MOVING BELTS. APR. 2, 1974. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,860,340.—OPTICAL ALIGNMENT ON VACUUM PLENUM. JAN. 14, 1975. BEL. 0784630, FRA. 7220686, GRB. 1379674, ITL. 0956164.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,961,849.—ELECTROSTATIC PRINTING MACHINE. JUNE 8, 1976. ARG. 0200108, ATR. 0323556, AUS. 0458405, BEL. 0776599, CAN. 0948274, FRA. 7145342, GRB. 1374799, ITL. 0943875, MEX. 0127493, PNM. 0718307, SAF. 0718307, SPN. 0397851, STZ. 0554009, SWD. 7115731, VZL. 0032936.
4,094,606.—XEROGRAPHIC SYSTEM EMPLOYING WAVEGUIDE ADDRESSING AND MODULATING APPARATUS. JUNE 13, 1978.

Class 1J 7

3,099,944.—XEROGRAPHIC CONTROL APPARATUS. AUG. 6, 1963. CAN. 0738131, IND. 0096308, JAP. 0491992.
3,512,885.—ACCOUNTING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. MAY 19, 1970. ARG. 0152214, ATR. 0285324, AUS. 0409894, BEL. 0670170, BRA. 0086686, CAN. 0763624, CHL. 0022095, CLB. 0015661, COS. 0001881, DNK. 0125559, ECD. 0000019, EGR. 0050203, EIR. 0029756, ELS. 0000939, FRA. 1459931, GER. 1522804, GRB. 1122622, GRK. 0030861, GUA. 0001741, HOL. 0146300, IND. 0096570, ISR. 0024363, ITL. 0729658, JAP. 0513607, LXB. 0049537, MEX. 0079047, NOR. 0124392, NZL. 0142991, PAK. 0116058, PLP. 0005074, PNM. 0002079, PRU. 0008106, PTG. 0044651, SAF. 0655276, SPN. 0318011, STZ. 0438031, SWD. 0358037, TRK. 0013473, UAR. 0007497, URG. 0006622, VZL. 0023997.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590. ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.

Class 1J 8

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,348,521.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799398.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,816,756.—AUTOMATIC BIAS CONTROL. JUNE 11, 1974.
3,851,966.—REPRODUCTION APPARATUS. DEC. 3, 1974. BEL. 808482.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11,, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.

Class 1K

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,638,110.—DEVC FOR MEASRNG CHRG ON MATRIAL BY CONVRTNG INTO ELCTRCL SGNLS FRICTNL FORCS CAUSD BY CHARGE. JAN. 25, 1972. AUS. 0161306, BEL. 0746479, FRA. 7007991, GRB. 1280803, HUN. 0161306, ITL. 0892329, JAP. 0681943, PLD. 0069581, SPN. 0376910, STZ. 0519185, SWD. 0364418, USR. 0412696.
3,661,453.—ELECTROSTATIC LABEL PRINTER. MAY 9, 1972. CAN. 0927471, FRA. 7122950, GRB. 1345800, ITL. 0927543.
3,893,175.—RECORDER FOR MONITORING COPIERS. JULY 1, 1975. GRB. 1427292.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,016,310.—COATR HRDWR & METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,023,901.—REPRODUCTION MACHINE SERVICE CONTROL. MAY 17, 1977.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,026,397.—CONTROL KNOB CLUTCHES WITH LOCK. MAY 31, 1977.
4,134,137.—SINGLE WIRE MICROELECTROMETER IMAGING SYSTEM. JAN. 9, 1979.

Class 1K 1

3,835,380.—ELECTROMETER SYSTEM. SEPT. 10, 1974.
3,852,668.—ELECTROMETER SYSTEM. DEC. 3, 1974.
3,887,845.—COPIER PHOTORECEPTOR CHARGE CONTROL. JUNE 3, 1975. GRB. 1465969.
3,891,316.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 24, 1975.
3,898,001.—ELCTROMETR SYSTM FOR NON-CNTCT DETCTN OF ELCTRSTATC CHRGE ON A MVNG ELCTRSTGRPHC IMAGNG SURFACE. AUG. 5, 1975.
3,909,126.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 30, 1975.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,935,531.—ELECTROMETER WITH LOW VOLTAGE INDICATOR. JAN. 27, 1976.
3,935,532.—AUTOMATIC ZEROING ELECTROMETER. JAN. 27, 1976.
3,998,538.—ELECTROMETER APPARATUS FOR REPRODUCTION MACHINES. DEC. 21, 1976.
4,000,944.—PHOTORECEPTOR FOR ELECTROSTATIC REPRODUCTION MACHINES WITH BUILT IN ELECTRODE. JAN. 4, 1977.
4,003,650.—CONTROLLER FOR REPRODUCTION APPARATUS. JAN. 18, 1977.
4,100,484.—D.C. ELECTROMETER. JULY 11, 1978.
4,105,321.—ILLUMINATED CHARGE CONTROL SYSTEM FOR XEROGRAPHIC MACHINES. AUG. 8, 1978.
4,127,806.—SHIELDED ELECTROMETER WHOSE OUTPUT IS USED TO CONTROL WIDTH OF PULSES FED BACK TO THE SHIELD. NOV. 28, 1978.
4,139,813.—ADAPTOR FOR AN ELECTROMETER PROBE TO PERMIT CONTACT POTENTIAL MEASUREMENTS AND METHOD FOR USE. FEB. 13, 1979.
4,149,119.—COMBINED AC-DC ELECTROMETER WITH AC FEEDBACK FOR DRIFT COMPENSATION. APR. 10, 1979.

Class 1K 2

3,335,003.—REFLEX XEROGRAPHIC PROCESS. AUG. 8, 1967. CAN. 0764912, FRA. 1415836, GER. 1261398, GRB. 1059657, ITL. 0741353, JAP. 0511404.
3,337,339.—SCREEN XEROGRAPHY. AUG. 22, 1967. AUS. 0291558, BEL. 0638029, CAN. 0729824, DNK. 0114045, FRA. 1404424, GER. 0114045, GRB. 1027354, HOL. 0130250, ITL. 0706191, JAP. 0489562, LXB. 0044538, NOR. 0109228, SWD. 0321859.
3,676,118.—REFLEX XEROGRAPHY IMAGING SYSTEM. JULY 11, 1972.
4,063,154.—D.C. ELECTROMETER. DEC. 13, 1977.
4,063,155.—D.C. ELECTROMETER PROBE. DEC. 13, 1977.
4,106,869.—DISTANCE COMPENSATED ELECTROSTATIC VOLTMETER. AUG. 15, 1978.

Class 1K 3

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 2

4,043,549.—IMPACT FEEDER AUG. 23, 1977.
4,059,353.—PHOTORECEPTOR BELT SYSTEM. NOV. 22, 1977.

Class 2A

3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLF AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,060,105.—TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER. NOV. 29, 1977.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,924.—IMAGING SURFACE SMOOTHING WITH ROUGHENED FOIL NICKEL. MAR. 14, 1978.

Class 2A 1

3,764,315.—AMBIPOLAR ELECTROPHOTOGRAPHIC PLATE. OCT. 9, 1973. BEL. 0802608, GRB. 1421948.
3,948,656.—IMPROVED METHOD FOR THE PREPARATION OF CDSSE. APR. 6, 1976.

Class 2A 1A

3,077,386.—PROCESS FOR TREATING SELENIUM. FEB. 12, 1963. CAN. 0705359.
3,170,790.—RED SENSITIVE XEROGRAPHIC PLATE AND PROCESS THEREFOR. FEB. 23, 1965.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,234,020.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. FEB. 8, 1966.
3,460,296.—METAL WORKING. AUG. 12, 1969. BEL. 0705574, CAN. 0853918, GRB. 1196684.
3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237.
3,517,995.—METHOD & APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,552,848.—XEROGRAPHIC PLATE. JAN. 5, 1971.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.
3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.
4,007,255.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 8, 1977.
4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.
4,019,014.—METHOD FOR HEAT WELDING SELENIUM. APR. 19, 1977.

Class 2A 1B

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,467,548.—METHOD OF MAKING XEROGRAPHIC PLATE BY VACUUM EVAPORATION OF SELENIUM ALLOY. SEPT. 16, 1969.
3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.
3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.
3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.
3,615,413.—INDIUM DOPING OF A SE-AS PHOTOCONDUCTIVE ALLOYS. OCT. 26, 1971. CAN. 0917981, GRB. 1309312, JAP. 07[illegible]28.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,685,989.—AMBIPOLAR PHOTORECEPTOR AND METHOD OF IMAGING. AUG. 22, 1972. CAN. 0971800, GRB. 1360078.

3,697,265.—VTRS SELNUM ALLY MTRX CNTNING ISLTD PRTCLS/PRTCL NETWKS OF RSN. OCT. 10, 1972. ARG. 0183560, ATR. 0299699, AUS. 0449439, BEL. 0752439, CAN. 0933014, EGR. 0090944, FRA. 7023472, GRB. 1319341, ITL. 0894623, MEX. 0116409, PNM. 0002539, SPN. 0409740, STZ. 0000000, SWD. 7216008, TIW. 0006838, USR. 0374867, VZL. 0031909.

3,879,199.—SURFACE TREATMENT OF ARSENIC-SELENIUM PHOTOCONDUCTORS. APR. 22, 1975.

3,884,688.—PHOTOSENSITIVE ELEMENT EMPLOYING A VITREOUS BISMUTH-SELENIUM FILM. MAY 20, 1975.

3,887,368.—COMPOSITION. JUNE 3, 1975.

3,898,083.—HIGH SENSITIVITY VISIBLE INFRARED PHOTOCONDUCTOR. AUG. 5, 1975.

3,909,458.—PHOTOSENSITIVE VITREOUS LAYER COMPRISING BISMUTH AND SELENIUM. SEPT. 30, 1975.

4,015,029.—SELENIUM & SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

4,126,457.—EVAPORATION TECHNIQUE FOR PRODUCING TEMPERATURE PHOTORECEPTOR ALLOYS. NOV. 21, 1978. CAN. 1046864.

Class 2A 1C

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY. 7, 1964. FRA. 1260498, GRB. 0960871.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,682,631.—METHOD OF FORMING AN ELECTROPHOTOGRAPHIC LAYER CONTAINING A BENZOQUANAMINE RESIN BINDER. AUG. 8, 1972.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,971,742.—ORGANO-CHALCOGEN COMPOSITIONS. JULY 27, 1976.

Class 2A 1D

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,627,573.—COMPOSITION AND METHOD. DEC. 14, 1971. ARG. 0176480, AUS. 0441224, BEL. 0721965. CAN. 0892493, FRA. 0095985, GRB. 1251630, ITL. 0889828, MEX. 0124897, SPN. 0358960, STZ. 0517359, VZL. 0030358.

Class 2A 1E

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,879,200.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING BIX-BENZIMIDAZOLE PIGMENTS. APR. 22, 1975. ARG. 0188392, AUS. 0465970, BEL. 0763545, BRA. 0088118, CAN. 0928125, CHL. 0027130, EGR. 0093279, FRA. 7107565, GRB. 1337222, ITL. 0919105, MEX. 0122169, PNM. 0002460, SAF. 0711225, SPN. 0388590, TIW. 0008178, USR. 0449515.

3,909,261.—XEROGRAPHIC IMAGING MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. SEPT. 30, 1975. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

Class 2A 1E 1

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

Class 2A 1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. GRB. 1106562.

3,498,835.—METHOD FOR MAKING XEROGRAPHIC PLATES. MAR. 3, 1970. ARG. 0154134, AUS. 0418468, BEL. 0700454, CAN. 0872174, FRA. 1529285, GRB. 1189504, ITL. 0807717, JAP. 0567234, MEX. 0096199, SPN. 0342303, STZ. 0479093, SWD. 0332346, VZL. 0024014.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

Class 2A 1G

3,288,603.—METHOD OF RESTORING XEROGRAPHIC PROPERTIES TO A GLASS BINDER PLATE. NOV. 29, 1966. CAN. 0800955, FRA. 1432127, GER. 1497201, GRB. 1088473, ITL. 0802168, JAP. 0519677.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,451,846.—PROCESS OF MAKING XEROGRAPHIC PLATE. JUNE 24, 1969. CAN. 0818384, GRB. 1183961, JAP. 0598621.

3,510,298.—PROCESS OF ACTIVATING PHOTOCONDUCTIVE MATERIAL IN GLASS BINDER. MAY 5, 1970. CAN. 0834668, GER. 1572366, GRB. 1189822, JAP. 0552968.

3,537,848.—PROCESS OF TREATING A XEROGRAPHIC GLASS BINDER PLATE AND PRODUCT. NOV. 3, 1970. ARG. 0180580.

3,655,376.—ELECTROPHOTOGRAPHIC DENITRIFIED GLASS BINDER PLATE. APR. 11, 1972.

3,885,962.—PHOTOGRAPHIC AND ELECTROPHOTOGRAPHIC MEMBERS WITH GLASS FIBER CONTAINING PAPER SUBSTRATES. MAY 27, 1975.

Class 2A 2

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,870,516.—METHOD OF IMAGING PHOTOCONDUCTOR IN CHARGE TRANSPORT BINDER. MAR. 11, 1975. AUS. 0466028, BEL. 0763541, CAN. 0931413, CHL. 0026797, EGR. 0094762, FRA. 7107559, GRB. 1343671, ITL. 0919108, MEX. 0122098, NZL. 0162883, PNM. 0002450, SAF. 0711219, SPN. 0388584, STZ. 0567744.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,702.—PHTOELCTRC & ELCTRPHTGRPHC PGMNTS COMPRISING DERIVATIVES OF CONDENSED PLYCYLC ARMATC HYDRCABN A. OCT. 28, 1975.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALTZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,926,629.—ELECTROPHOTOGRAPHIC METHOD AND PLATE EMPLOYING A PHTHALOCYANINE POLYMER. DEC. 16, 1975.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

4,043,812.—A PROCESS FOR PREPARATION OF 2-ANTHRYL & SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLY. AUG. 23, 1977. BEL. 822305, FRA. 7527053, STZ. 32598.

4,089,684.—IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES. MAY 16, 1978.

4,117,239.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS & POLYMERS. SEPT. 26, 1978. BEL. 822305.

Class 2A 2A

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,553,009.—PROCESS OF PREPARING AN ELECTROPHOTOGRAPHIC MATERIAL. JAN. 5, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463274.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,689.—POLYCYCLIC AROMATIC POLYMER AS A PHOTO-CONDUCTOR OR OVERLAYER. MAY 20, 1975.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,899,329.—MIXTURE OF PHOTOCONDUCTORS IN AN ACTIVE MATRIX. AUG. 12, 1975. ARG. 0187047, ATR. 327000, AUS. 0450862, BEL. 0775968, CAN. 0971797, CHL. 0027272, FRA. 7143179, GRB. 1348138, GUA. 0002724, ITL. 0941822, MEX. 1328040, PNM. 0002602, SAF. 0718022, SPN. 397403, STZ. 0026771.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

3,941,085.—RELEASE MATERIAL APPLICATOR. MAR. 2, 1976.

3,941,750.—POLYVINYL PYREMAL-AN INTRINSIC PHOTOCONDUCTOR AND ACTIVE MATRIX POLYMER. MAR. 2, 1976.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE & PROESS. FEB. 1, 1977.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

4,046,563.—PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYREME, ARTICLE AND PROCESS OF USE. SEPT. 6, 1977. FRA. 7509147.

4,050,934.—ELECTRON ACCEPTOR MONOMERS & POLYMERS. SEPT. 27, 1977.

4,056,391.—METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHO. NOV. 1, 1977.

4,072,519.—PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT. FEB. 7, 1978. FRA. 7509146.

4,076,528.—XEROGRAPHIC BINDER PLATE. FEB. 28, 1978. AUS. 456887, BEL. 775967, CAN. 971796, CHL. 27271, FRA. 7143178, GRB. 1358269, ITL. 941821, MEX. 124712, PNM. 2599, SAF. 718023, SPN. 397402, STZ. 26772.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978. AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,098,795.—METHOD FOR THE PREPARATION OF X-FORM METAL FREE PHTHALOCYAMINE. JULY 4, 1978. ARG. 182328, BEL. 737989, CAN. 899870, FRA. 6928871, GER. 1943381, GRB. 1280843, ITL. 870314, JAP. 654041, MEX. 116011.

4,122,114.—1-TRICYANOINYLPYRENE. OCT. 24, 1978.

4,153,802.—ELECTRON ACCEPTOR MONOMERS AND POLYMERS. MAY 8, 1979. FRA. 7626102.

4,161,490.—ELECTRON ACCEPTOR MONOMERS. JULY 17, 1979. FRA. 7626102.

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3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

4,069,046.—POLYMERIZED VINYL CARBAZOLES SENSITIZED BY NITRO-SUGSTITUTED 9-DICYANOMETHYLENE FLUORENES. JAN. 17, 1978.

Class 2A 2C

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

Class 2A2E

4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 2B

3,617,265.—METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE. NOV. 2, 1971.

3,635,705.—MULTI-LAYERED HALOGEN-DOPED SELENIUM PHOTOCONDUCTIVE ELEMENT. JAN. 18, 1972. GRB. 1311329, ITL. 0901916, JAP. 0739531.

3,639,120.—2-LAYERED PHOTOCONDUCTIVE ELEMNT CONTNG A HALOGEN DOPED STORG LAYER AND SELENIUM ALLOY CNTRL LAYER. FEB. 1, 1972. CAN. 0870535, GRB. 1193876, JAP. 0558440.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,712,810.—AMBIPOLAR PHOTORECEPTOR AND METHOD. JAN. 23, 1973. CAN. 0971025, GRB. 1363266.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,928,034.—ELECTRON TRANSPORT LAYER OVER AN INORGANIC PHOTOCONDUCTIVE LAYER. DEC. 23, 1975. AUS. 0453265, BEL. 0763542, CAN. 0932199, CHL. 0026802, EGR. 0093924, FRA. 7107560, GRB. 1337227, GUA. 0002423, ITL. 0919109, MEX. 0121682, NZL. 0162884, PNM. 0002473, SAF. 0711220, SPN. 0388585, STZ. 0576659, SWD. 0363176, TIW.00 07181.

3,953,207.—A COMPOSITE LAYERED PHOTORECEPTOR. APR. 27, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,012,251.—MULTI-LAYERED PHOTOCONDUCTIVE MEMBER. MAR. 15, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATRIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,018,602.—METHOD FOR IN-SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE. APR. 19, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,047,948.—COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY. SEPT. 13, 1977.

4,047,949.—COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY. SEPT. 13, 1977.

4,049,449.—METHOD FOR FORMING AN ELECTROPHOTOGRAPH IC MEMBER. SEPT. 20, 1977.

4,050,935.—TRIGONAL SE LAYER OVERCOATED BY BIS(4-DIETHYLAMINO-2-METHYLPHENYL) PHENYLMETANE CONTAINING. SEPT. 27, 1977. FRA. 7709994.

4,052,205.—PHOTOCONDUCTIVE IMAGING MEMBER WITH STUBSTITUTED ANTHRACENE PLASTICIZER. OCT. 4, 1977.

4,053,311.—POLY-L-VINYL CARBAZOLE IMAGE TRANSPORT LAYER PLASTICIZED OF BIS-(4-DIETHYLAMINO-2-METHYLPHE. OCT. 11, 1977.
4,062,886.—FLUORENONE CARBOXYLE ACID ESTERS. DEC. 13, 1977. FRA. 7621895.
4,063,947.—PHOTOCONDUCTIVE INSULATING FILMS COMPRISING FLUORENONE-SUBSTITUTED OLIGOMERS. DEC. 20, 1977.
4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1977.
4,078,925.—A COMPOSITE LAYERED PHOTORECEPTOR. MAR. 14, 1978.
4,081,274.—COMPOSITE LAYERED PHOTORECEPTOR. MAR. 28, 1978.
4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.
4,115,116.—IMAGING MEMBER HAVING A POLYCARBONATE-BIPHENYL DIAMINE CHARGE TRANSPORT LAYER. SEPT. 19, 1978.
4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.
4,117,072.—PROCESS FOR ENHANCEME NT OF MECHANICAL PROPERTIES OF PHOTOCONDUCTIVE POLYMERS. SEPT. 26, 1978. FRA. 7531736. GRB 1469371.
4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.
4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.
4,140,529.—CHARGE TRANSPORT OVERLAYER IN PHOTOCONDUCTIVE ELEMENT AND METHOD OF USE. FEB. 20, 1979.
4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.

Class 2B 1

3,243,293.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. MAR. 29, 1966. CAN. 0830430.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,539,255.—XEROGRAPHIC RECORDING APPARATUS - LIGHT-CONTROLLED-CHARGE STORAGE LAYER. NOV. 10, 1970.
3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.
3,619,153.—PHOTOCONDUCTIVE ELMNT AND PROCESS EMPLYNG SBSTUTD SILYLISOBUTYLETHYLENEDIAMINE ADHESIVE INTERLAYE. NOV. 9, 1971. ARG. 0180118, ATR. 0305764, AUS. 0434739, BEL. 0733402, BUL. 0017353, CAN. 0898034, DNK. 0131833, EGR. 0078900, FRA. 6917079, GRB. 1229559, GRK. 0040058, IND. 0121424, ISR. 0032250, ITL. 0864983, JAP. 0702563, LXB. 0058678, MEX. 0109385, NOR. 0125557, NZL. 0156506, PAK. 0121226, PLP. 0008481, PNM. 0001683, PTG. 0051754, RHD. 2236953, RMN. 0054256, SAF. 0693687, SPN. 0367618, STZ. 0511461, SWD. 0341926, TIW. 0006442, TRK. 0015647, USR. 0300036, VTM. 0001865.
3,713,821.—PHOTORECEPTOR INTERFACE. JAN. 30, 1973. ARG. 0194731, ATR. 0322357, AUS. 0464711, BEL. 0784453, CAN. 0964916, EGR. 0099870, FRA. 7220691, GRB. 1393612, ISR. 0039655, ITL. 0959793, SAF. 0723958, SPN. 0403454, STZ. 0554007, SWD. 0367491, VZL. 0032939.
3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.
3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,795,513.—METHOD OF STORING AN ELECTROSTATIC IMAGE IN A MULTILAYERED PHOTORECEPTOR. MAR. 5, 1974. BEL. 0788303, CAN. 976018, FRA. 7230831, GRB. 1388934, ITL. 0964410, SWD. 7211341.
3,799,775.—XEROGRAPHIC SYSTEM. MAR. 26, 1974. ARG. 0172053, ATR. 0300559, AUS. 0423123, BEL. 0720940, BRA. 6800650, BUR. 0000043, CAM. 00043/3, CAN. 0895805, CHL. 0024257, EIR. 0032903, FRA. 1586238, GNR. 0000039, GRB. 1243384, GRK. 0039223, IND. 0119625, ISR. 0031543, ITL. 0844307, LEB. 0002816, LIB. P102693, LXB. 0056890, MEX. 0105163, MLG. 0003058, MLW. 00MW569, MNC. 8126975, MRC. 0014727, NOR. 0128132, NZL. 0153781, PAK. 0120895, PLP. 0009065, PNM. 0002053, PTG. 0050322, RHD. 5369487, SAF. 0681107, SPN. 0358355, STZ. 0506102, SWD. 0345530, TGR. 0000547, URG. 0009361, VTM. 0001830, VZL. 0023696, ZMB. 0156971.
3,816,288.—GLOW DISCHARGE TECHNIQUE FOR THE PREPARATION OF ELECTROPHOTOGRAPHIC PLATES. JUNE 11, 1974.
3,888,667.—HETROPHASE ADHESIVE COMPOSITIONS CONTAINING POLYSULFONE FOR METAL-SELENIUM COMPOSITIES. JUNE 10, 1975.
3,891,435.—HETEROPHASE ADHESIVE COMPOSITIONS CONTAINING CHLOROSULFONATED POLYETHLENE FOR METAL-SELENIUM CO. JUNE 24, 1975.
3,895,131.—ELECTROLESS COATING METHOD. JULY 15, 1975.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,958,207.—INJECTION CURRENT DEVICE AND METHOD. MAY 18, 1976.
4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.
4,106,935.—XEROGRAPHIC PLATE HAVING AN PHTHALOCYANINE PIGMENT INTERFACE BARRIER LAYER. AUG. 15, 1978.

Class 2B 2

3,092,493.—PROTECTED XEROGRAPHIC PLATE. JUNE 4, 1963.
3,146,145.—PROCESS FOR ADHERING PLASTIC TO VITREOUS SELENIUM. AUG. 25, 1964.
3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.
3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.
3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.
3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.
3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.
3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,837,849.—MULTILAYERED VARIABLE SPEED PHOTORECEPTOR AND METHOD OF USING SAME. SEPT. 24, 1974. BEL. 0788302, CAN. 0978007, FRA. 7230830, GRB. 1401040, ITL. 0964409, SWD. 7211342.
3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,868,983.—HAND TOOL. MAR. 4, 1975.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,912,511.—MULTICOMPONENT ORGANIC COATING OF POLYESTER POLYURETHAND AND HUMIDITY. OCT. 14, 1975. ARG. 0182692, BEL. 0767325, CAN. 0938143, FRA. 7118948, GRB. 1350476, ITL. 0926822, MEX. 0121668.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.

4,006,019.—METHOD FOR PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,006,020.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,012,255.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAR. 15, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,064,514.—PORTABLE CAMERA. DEC. 20, 1977.

4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.

4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.

4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.

4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES. JULY 11, 1978.

4,123,269.—ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE COMPRISING HOLE INJECTING AND HOLE TRANSPORT LAYER. OCT. 31, 1978.

4,126,455.—ELECTROSTATOGRAPHIC IMAGING PROCESS AND RELATED APPARATUS. NOV. 21, 1978. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

4,147,541.—ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT. APR. 3, 1979. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 2B 3

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

Class 2B 4

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.

4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2C

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,317,316.—INTERNAL FROST RECORDING. MAY 2, 1967. ATR. 0272830, AUS. 0292886, BEL. 0648043, CAN. 0882890, FRA. 1399017, GER. 1243018, GRB. 1069741, ITL. 0725002, JAP. 0521009, LXB. 0046101, NOR. 0122729, STZ. 0469292, SWD. 0319083.

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,443,937.—IMAGE RESOLUTION. MAY 13, 1969. CAN. 0824316, GRB. 1137766, JAP. 0544235.

3,443,938.—FROST IMAGING EMPLOYING A DEFORMABLE ELECTRODE. MAY 13, 1969. CAN. 0801263, FRA. 1441806, GRB. 1073097, JAP. 0573732.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,707,391.—IMAGING PROCESS. DEC. 26, 1972.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

3,892,567.—ELECTROSTATICALLY DEFORMABLE MATERIALS. JULY 1, 1975. ARG. 0196065, BEL. 0781973, CAN. 9814520, FRA. 7213876, GRB. 1394286, ITL. 0951328, MEX. 0124825.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,054,381.—TONER FILTER ARRANGEMENT. OCT. 18, 1977.

4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

4,093,369.—CLEANING SYSTEM. JUNE 6, 1978.

Class 2D

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLD. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,130,274.—PNEUMATIC REGISTRATION APPARATUS. DEC. 19, 1978. BEL. 847912. SAF. 6401.

Class 2E

3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 078 0598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.

3,350,203.—XEROGRAPHIC PLATE. OCT. 31, 1967. CAN. 0715017, FRA. 1421950, GER. 1270400, GRB. 1085989, ITL. 0750417, JAP. 0511420.

3,447,957.—METHOD OF MAKING A SMOOTH SURFACED ADHESIVE BINDER XEROGRAPHIC PLATE. JUNE 3, 1969. CAN. 0788947.

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.

3,536,397.—XEROGRAPHIC APPARATUS. OCT. 27, 1970. CAN. 0917231.

3,536,481.—ELECTROLYTIC PROCESS OF FORMING A XEROGRAPHIC BELT. OCT. 27, 1970. ARG. 0175659, AUS. 0416583, BEL. 0716410, CAN. 0865080, FRA. 1572605, GRB. 1200670, ITL. 0859021, MEX. 0103043, SWD. 0345698.

3,536,485.—XEROGRAPHIC PLATE SUPPORTED BY A MANDREL. OCT. 27, 1970.

3,578,445.—XEROGRAPHIC PLATE FABRICATION. MAY 11, 1971.

3,634,134.—METHOD OF MAKING A PHOTOCONDUCTIVE COMPOSITION AND DEVICE. JAN. 11, 1972. ARG. 0184074, ATR. 0307226, AUS. 449514, BEL. 0752440, CAN. 0904111, EGR. 0083703, FRA. 7023473, GRB. 1319342, ITL. 0894622, MEX. 0117839, PNM. 0002547, SPN. 0381111, STZ. 0548624, SWD. 0351734, TIW. 0007153.

3,695,757.—XEROGRAPHIC PLATE. OCT. 3, 1972.

3,746,571.—METHOD OF VACUUM EVAPORATION. JULY 17, 1973.

3,752,691.—METHOD OF VACUUM EVAPORATION. AUG. 14, 1973.

3,756,811.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIALS OF DIFFERENT DYNAMIC RANGES. SEPT. 4, 1973. CAN. 0894715, GRB. 1226578.

3,787,208.—XEROGRAPHIC IMAGE MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. JAN. 22, 1974. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

3,788,889.—METHOD OF PREPARING BINDER LAYERS. JAN. 29, 1974.

3,837,906.—METHOD OF MAKING A XEROGRAPHIC BINDER LAYER AND LAYER SO PREPARED. SEPT. 24, 1974. ARG. 0186444, ATR. 0319750, AUS. 0448147, BEL. 0763392, CAN. 0939204, CHL. 0027098, FRA. 7107568, GRB. 1292425, ITL. 0918910, NZL. 0162892, PNM. 0002439, SAF. 0711228, SPN. 0388640, STZ. 0558554, SWD. 0036479, TIW. 0007713.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,894,868.—ELECTRON TRANSPORT BINDER STRUCTURE. JULY 15, 1975. AUS. 0461951, BEL. 0763543, CAN. 0932196, CHL. 0026795, EGR. 0096346, FRA. 7107561, GRB. 1337226, GUA. 0002467, ITL. 0919110, MEX. 0120807, NZL. 0162885, PNM. 0002481, SAF. 0711221, SPN. 0388586, TIW. 0007182, USR. 0444380.

3,911,091.—MILLING TRIGONAL SELENIUM PARTICLES TO IMPROVED XEROGRAPHIC PERFORMANCE. OCT. 7, 1975.

3,911,162.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. OCT. 7, 1975. BEL 0798324.

3,926,762.—R F SPUTTERING OF TRIGONAL SELENIUM FILM. DEC. 16, 1975.

3,944,682.—METHOD OF PROVIDING AN ELECTROPHOTOGRAPHIC COATING AND COMPOSITIONS FOR METHOD. MAR. 16, 1976.

3,945,723.—RESILIENT ROLLERS. MAR. 23, 1976. ARG. 0205448.

3,954,466.—ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAY 4, 1976.

3,979,495.—METHOD OF MAKING A PHOTORECPTOR. SEPT. 7, 1976.

3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,014,697.—ELECTROSTATOGRAPHIC IMAGING MEMBER. MAR. 29, 1977.

4,014,728.—METHOD OF MAKING AN IMAGING MEMBER. MAR. 29, 1977.

4,015,985.—COMPOSITE XEROGRAPHIC PHOTORECPTOR WITH INJECTING CONTACT LAYER. APRIL 5, 1977. BEL. 0840221.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

4,033,768.—METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE. JULY 5, 1977.

4,047,973.—RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HUDRAULIC LATHING. SEPT. 13, 1977.

4,071,363.—METHOD OF MAKING COMPOSITE XEROGRAPHIC PHOTORECEPTOR WITH INJECTING CONTACT LAYER FOR A PHO. JAN. 31, 1978. BEL. 840221. FRA. 7610576.

4,072,518.—METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE. FEB. 7, 1978.

4,076,183.—PHOTOCONDUCTOR INCREMENTING APPARATUS. FEB. 28, 1978.

4,076,564.—ROUGHENED IMAGING SURFACE FOR CLEANING. FEB. 28, 1978.

4,103,994.—RECORDING PLATE. AUG. 1, 1978.

4,115,115.—CRYSTALLIZATION OF SELENIUM IN POLYMER MATRICES VIA IN SITU GENERATION OF ORGANIC CRYSTALLIZATION. SEPT. 19, 1978.

4,122,030.—FORMATION OF COLLOIDAL DISPERSIONS OF SELENIUM BY THE LOCUS CONTROL METHOD. OCT. 24, 1978.

4,126,457.—EVAPORATION TECHNIQUE FOR PRODUCING TEMPERATURE PHOTORECEPTOR ALLOYS. NOV. 21, 1978. CAN. 1046864.

Class 2F

3,143,044.—XEROGRAPHIC PLATE HOLDER. AUG. 4, 1964.

3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,820,888.—MISTRACK INTERLOCK FOR SELENIUM BELT. JUNE 28, 1974.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,874,790.—FAIL-SAF MECH STPNG MVMNT PHTCNDCTV BLT ELTRSTC REPRDCTN MACH WHEN TRCKNG BECOMES IREGULAR AND UN. APR. 1, 1975.

3,888,577.—APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY. JUNE 10, 1975. BEL. 0810900.

3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.

4,005,285.—OPTICAL SYSTEM FOR EXTENDING PHOTOSENSOR ARRAY RESOLUTION. JAN. 25, 1977.

4,009,388.—ARRANGEMENT FOR EXTENDING PHOTOSENSOR ARRAY SOLUTION. FEB. 22, 1977.

4,027,966.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.

4,040,157.—DRUM SUPPORT APPARATUS. AUG. 9, 1977.

4,068,942.—ADVANCED PHOTORECEPTOR. JAN. 17, 1978. BEL. 847264, FRA. 7630970.

4,088,403.—REPLENISHABLE PHOTOSENSITIVE SYSTEM. MAY 9, 1978.

4,105,345.—EXPANDABLE PHOTORECEPTOR ENDBELLS. AUG. 8, 1978.

4,120,576.—DRUM SUPPORT APPARATUS. OCT. 17, 1978.

Class 3

3,935,517.—CONSTANT CURRENT CHARGING DEVICE. JAN. 27, 1976.

Class 3A

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,684,364.—LIFTOFF ELECTRODE. AUG. 15, 1972.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,884,181.—CAPILLARY BAFFLE-CONSTANT OIL HEIGHT INDEPENDENT TO OIL LEVEL. MAY 20, 1975.
3,893,800.—BACKSIDE HEATING AND FIXING APP IN AN ELECTRONIC PHOTOGRAPH DUPLICATOR. JULY 8, 1975.
3,957,423.—STRIPPER FINGER DESIGN. MAY 18, 1976.
4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.
4,082,444.—LAMP CARRIAGE DRIVE SYSTEM. APR. 4, 1978.

Class 3B

3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,449,568.—CORONA DISCHARGE APPARATUS FOR CREATING AN ELECTROSTATIC CHARGE PATTERN ON A XEROGRAPHIC SURFAC. JUNE 10, 1969. CAN. 0858664.
3,532,494.—SOLID AREA DEVELOPMENT IN XEROGRAPHY EMPLOYING AN INSULATING SCREEN IN THE CHARGING STEP. OCT. 6, 1970.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23,1977.
4,073,587.—COROTRON APPARATUS. FEB. 14, 1978.
4,095,233.—METHOD FOR FORMING A CHARGE PATTERN. JUNE 13, 1978.

Class 3C

3,122,634.—CONTROLLED CHARGING IN XEROGRAPHIC COPYING APPARATUS. FEB. 25, 1964. CAN. 0706543, FRA. 1352624, GER. 1210323, GRB. 1026262, JAP. 0446815.
3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,335,274.—XIC CHARGING APPARATUS WITH MEANS TO AUTOMATICALLY CONTROL THE POT ENTAIL APPLIED TO THE CORONA. AUG. 8, 1967. CAN. 0801834, FRA. 1459487, GRB. 1121498, ITL. 0734870, MEX. 0085777.
3,382,360.—XIC CHARGING SYSTEM HAVING MEANS FOR PROVIDING AN AIR CUSHION BETWEEN CHARGING DEVICE AND XIC DR. MAY 7, 1968.
3,457,405.—CORONA WIRE MOUNTING MEANS WHICH COMPENSATES FOR WIRE EXPANSION DUE TO HEAT. JULY 22, 1969. CAN. 0857406, GRB. 1196927.
3,471,695.—CORONA CHGNG APPTS W/MEANS TO URGE A FLOW OF AERIFORM FLUID ACROSS THE CORONA WIRES. OCT. 7, 1969. CAN. 0856355, GRB. 1220745.
3,483,372.—CORONA CHARGING DEVICE WITH CONDUCTIVE SHIELD AND INSULATING MEANS ON SAID SHIELD. DEC. 9, 1969. CAN. 0840508, GRB. 1169632, JAP. 0770817.
3,517,995.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,566,108.—CORONA GENERATING ELECTRODE STRUCTURE FOR USE IN A XEROGRAPHIC CHARGING METHOD. FEB. 23, 1971.
3,598,991.—ELCTRSTC CHRGNG DEV HAVNG SPRK GAP VOLTG REGULTR BETWEEN A CORONA SOURCE AND VOLTG SOURCE. AUG. 10, 1971. AUS. 0457211, BEL. 0754426, CAN. 0916233, CZC. 0163219, EGR. 0084558, FRA. 7029148, GRB. 1322378, ITL. 0901159, JAP. 0715800, PLD. 0070053, SPN. 0382404, STZ. 0513436, SWD. 0359663, TIW. 0007173, USR. 0442617.
3,604,925.—APPARATUS FOR CONTROLLING THE AMOUNT OF CHARGE APPLIED TO SURFACE. SEPT. 14, 1971.
3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED W/MIXTURE OF HYDROSCOPIC MATERIAL AND HYDROPHILIC B. OCT. 21, 1971.
3,675,011.—METHODS AND APPARATUS FOR OPERATING RAISED COROTRONS OF OPPOSITE POLARITY. JULY 4, 1972.
3,723,793.—COATED CORONA GENERATING ELECTRODE. MAR. 27, 1973.
3,742,237.—AC CORONA CHARGING APPARATUS. JUNE 26, 1973. CAN. 0955299, GRB. 1387209.
3,760,229.—A C COROTRON. SEPT. 18, 1973. GRB. 1410671.
3,769,506.—CORONA GENERATING METHOD AND APPARATUS THEREFOR. OCT. 30, 1973.
3,790,999.—CORONA WIRE APPARATUS. FEB. 12, 1974.
3,800,153.—ELECTROPHOTOGRAPHY CHARGING DEVICE. MAR. 26, 1974.
3,813,547.—CORONA GENERATING APPARATUS. MAY 28, 1974.
3,813,548.—CORONA GENERATING METHODS AND APPARATUS THEREFOR. MAY 28, 1974.
3,816,749.—EXPOSURE CONTROLLED CORONA DEVICE. JUNE 11, 1974.
3,851,229.—CURRENT MEASURING DEVICE. NOV. 26, 1974.
3,870,883.—ELECTROSTATIC PRINTING MACHINE WITH SELF-CLEANING CORONAL GENERATING DEVICE. MAR. 11, 1975.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,919,605.—CORONA DISCHARGE APPARATUS. NOV. 11, 1975.
3,922,548.—CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT. NOV. 25, 1975.
3,937,960.—CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. FEB. 10, 1976.
3,939,386.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. FEB. 17, 1976.
3,950,680.—ELECTROSTATOGRAPHIC DIAGNOSTIC SYSTEM. APR. 13, 1976.
3,976,880.—CORONA STABILIZATION ARRANGEMENT. AUG. 24, 1976.
3,976,881.—ARRANGEMENT FOR STABILIZING CORONA DEVICES. AUG. 24, 1976.
3,978,379.—CORONA GENERATING DEVICE WITH AN IMPROVED CLEANING MECHANISM. AUG. 31, 1976.
3,983,393.—CORONA DEVICE WITH REDUCED OZONE EMISSION. SEPT. 28, 1976.
3,996,466.—TRANSFER CORONA DEVICE WITH ADJUSTABLE SHIELD BIAS. DEC. 7, 1976.
4,027,960.—TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.
4,038,544.—IMPROVED APPARATUS AND METHOD FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. JULY 26, 1977.
4,038,546.—AN IMPROVED APPARATUS FOR A CORONA GENERATING DEVICE. JULY 26, 1977.
4,056,723.—ROTATIABLE CORONA DEVICE. NOV. 1, 1977.
4,068,284.—CORONA DISCHARGE DEVICE. JAN. 10, 1978. CAN. 1029794, FRA. 7432708, GRB. 1407718.
4,072,413.—ELECTROSTATOGRAPHIC REPRODUCTION METHODS AND MACHINES. FEB. 7,1978.
4,099,219.—CORONODE TENSIONING AND SUPPORT ARRANGEMENT. JULY 4, 1978.
4,100,411.—BIASING ARRANGEMENT FOR A CORONA DISCHARGE DEVICE. JULY 11, 1978.
4,110,811.—SUPPORT STRUCTURE FOR A CORONA GENERATING DEVICE. AUG. 29, 1978.
4,112,298.—CORONA WIRE MOUNTING MEANS. SEPT. 5, 1978.
4,112,299.—CORONA DEVICE WITH SEGMENTED SHIELD. SEPT. 5, 1978. GRB. 1499477.
4,118,751.—CORONODE CONNECTION ARRANGEMENT. OCT. 3, 1978.
4,138,719.—AUTOMATIC WRITING SYSTEMS AND METHODS OF WORD PROCESSING. FEB. 6, 1979. CAN. 1055161. GRB. 1530444.

Class 3C 1

3,076,092.—XEROGRAPHIC CHARGING APPARATUS. JAN. 29, 1963.

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,873,895.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. MAR. 25, 1975.

3,886,416.—METHOD AND APPARATUS FOR ADJUSTING COROTRON CURRENTS. MAY 27, 1975.

3,908,164.—CORONA CURRENT MEASUREMENT AND CONTROL ARRANGEMENT. SEPT. 23, 1975.

3,921,042.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED CORONA GENERATING DEVICE. NOV. 18, 1975.

3,961,193.—SELF ADJUSTING CORONA DEVICE. JUNE 1, 1976.

3,984,182.—PRETRANSFER CONDITIONING FOR ELECTROSTATIC PRINTING. OCT. 5, 1976.

4,038,593.—REGULATED HIGH VOLTAGE AC POWER SUPPLY WITH REGULATED DC BIAS CURRENT. JULY 26, 1977. BEL. 0846572.

4,039,257.—PRETRANSFER COROTRON SWITCHING. AUG. 2, 1977. GRB. 1498259

4,042,874.—HIGH VOLTAGE AC POWER SUPPLY WITH AUTOMATICALLY VARIABLE DC BIAS CURRENT. AUG. 16, 1977.

4,057,723.—COMPACT CORONA CHARGING DEVICE. NOV. 8, 1977. BEL. 850335, SPN. 455179.

4,086,650.—CORONA CHARGING DEVICE. APR. 25, 1978. BEL. 844116, SAF. 764178, SPN. 449789.

4,110,614.—CORONA DEVICE. AUG. 29, 1978.

Class 3C 2

3,304,476.—TRANSFER SWITCH FOR A XEROGRAPHIC APPARATUS. FEB. 14, 1967.

3,433,948.—NEGATIVE CORONA DISCHARGE SYSTEM USING ALTERNATING ELECTRIC FIELDS ACROSS THE AIR GAP. MAR. 18, 1969. CAN. 0855811, FRA. 1564157, GRB. 1211442, ITL. 0829718, JAP. 0655407.

3,541,329.—NEGATIVE CORONA DEVICE WITH MEANS FOR PRODUCING A REPELLING ELECTROSTATIC FIELD. NOV. 17, 1970. CAN. 0841136, FRA. 1546256, GRB. 1205040, JAP. 0634886.

4,140,874.—AUTOMATIC COMPENSATING CIRCUIT. FEB. 20, 1979. CAN. 1056919. GRB. 1522703.

Class 3C 3

3,146,385.—XEROGRAPHIC PLATE CHARGING METHOD AND APPARATUS. AUG. 25, 1964. GRB. 1013924.

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972.

3,689,767.—METHOD AND APPARATUS FOR UNIFORMLY CHARGING THE SURFACE OF AN INSULATING MEMBER. SEPT. 5, 1972.

3,709,595.—PRINTER SYSTEM. JAN. 9, 1973.

Class 3C 4

3,068,356.—XEROGRAPHIC CHARGING APPARATUS. DEC. 11, 1962. CAN. 0681400, GER. 1214996, GRB. 0990114.

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,496,351.—CORONA CONTROL CIRCUIT FOR STEPPING XEROGRAPHIC RECORDNG APPARATUS. FEB. 17, 1970. CAN. 0834978, FRA. 1512919, GRB. 1170472, ITL. 0793742, JAP. 0923309.

3,688,107.—ELECTROSTATOGRAPHIC CHARGING APPARATUS. AUG. 29, 1972. CAN. 0938660, GRB. 1365130.

3,875,407.—CORONA GENERATOR CLEANING APPARATUS. APR. 1, 1975.

3,908,127.—CORONA GENERATING DEVICES. SEPT. 23, 1975.

3,909,614.—SCOROTRON POWER SUPPLY CIRCUIT. SEPT. 30, 1975.

3,936,635.—CORONA GENERATING DEVICE. FEB. 3, 1976.

Class 3C 5

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 3C 6

3,549,962.—UNIFORM ELECTROSTATIC CHARGING. DEC. 22, 1970. CAN. 0897757, GRB. 1189578.

3,648,133.—UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE. MAR. 7, 1972.

3,743,830.—DEVICE FOR UNIFORMLY CHARGING A NON PLANAR ELECTROPHOTOGRAPHIC PLATE. JULY 3, 1973.

3,764,866.—CORONA GENERATOR. OCT. 9, 1973. ARG. 0198185, ATR. 0325420, AUS. 0467386, BEL. 0793227, CZC. 0168018, DNK. 0131699, FRA. 7245484, GRB. 1402739, ITL. 0972692, MEX. 0128581, NZL. 0169420, PTG. 0058386, SAF. 0729029, STZ. 0553435, SWD. 7216596.

3,792,913.—XEROGRAPHIC ERASE MECHANISM. FEB. 19, 1974. GRB. 1422175.

3,811,048.—ELECTROPHOTOGRAPHIC CHARGING APPARATUS. MAY 14, 1974.

3,967,119.—CORONA CHARGING DEVICE. JUNE 29, 1976.

3,967,891.—IMAGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. APR. 2, 1978.

Class 3C 7

3,323,373.—ESCAPEMENT MECHANISM. JUNE 6, 1967. CAN. 0841310.

3,324,291.—CORONA GENERATING DEVICE W/MEANS TO CAUSE AIR FLOW THERE-THROUGH TO MAINTN PARTS FREE OF DUST. JUNE 6, 1967. CAN. 0794904, GRB. 1070615, JAP. 0512648.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,496,352.—SELF-CLEANING CORONA GENERATING APPARATUS. FEB. 17, 1970. CAN. 0856356, GRB. 1227987, JAP. 0641478.

3,743,540.—SURFACE CLEANING BY IONIZED FLOW. JULY 3, 1973.

3,794,839.—CORONA GENERATING APPARATUS. FEB. 26, 1974. GRB. 1434863.

3,942,006.—CORONA GENERATOR CLEANING APPARATUS. MAR. 2, 1976.

3,965,400.—CORONA GENERATING DEVICE WITH IMPROVED BUILT IN CLEANING MECHANISM. JUNE 22, 1976.

4,019,055.—CORONA CLEANING ASSEMBLY. APR. 19, 1977. BEL. 0795870, GRB. 1416480.

Class 3C 8

3,335,273.—XIC CHARGING APPARATUS W/MEANS TO TERMINATE CHARGING CYCLE WHEN A

PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0794905, FRA. 1462556, GRB. 1128618, ITL. 0743940, JAP. 0632530, MEX. 0087314.

3,335,275.—XIC CHARGNG APPTS W/ADJSTBL MEANS TO TERMINATE CHRGNG CYCLE WHEN PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0801833.

3,667,036.—ELECTROMETER AMPLIFIER CIRCUITS. MAY 30, 1972.

3,678,350.—ELECTRIC CHARGING METHOD. JULY 18, 1972.

3,805,069.—REGULATED CORONA GENERATOR. APR. 16, 1974.

3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.

3,944,356.—A CHARGING APPARATUS. MAR. 16, 1976.

3,980,929.—CORONA CURRENT INTERRUPTER. SEPT. 14, 1976.

Class 3C 9

3,557,367.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF COR ONA CHARGING OF A PHOTOCONDUCTOR. JAN. 19, 1971. ARG. 0170822, BEL. 0720017, BRA. 6800368, CAN. 0879279, FRA. 1597512, GRB. 1244378, ITL. 0840366, JAP. 0628391, MEX. 0105427, VZL. 0023699.

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 0906045.

3,765,026.—ELECTROGRAPHIC RECORDING SYSTEM. OCT. 9, 1973. CAN. 0948272, GRB. 1365346.

4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.

Class 3D

3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.

3,398,336.—ELECTRICAL CHARGING UTILIZING TWO PHASE LIQUID MEDIUM. AUG. 20, 1968. CAN. 0815738, GRB. 1149074, JAP. 0562387.

3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.

3,907,559.—IMGNG PRCS EMPLYNG FRCTN CHRGNG IN THE PRESENCE OF AN ELECTRICALLY INSULATING DEVELOPER LIQUID. SEPT. 23, 1975.

3,971,658.—IMAGING PROCESS EMPLOYING FRICTION CHARGING IN THE PRESENCE OF AN ELECTRICALLY INSULATING LIQUID. JULY 27, 1976.

Class 3E

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

Class 3F

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,453,427.—ELEC LAMP FOR UNIFRMLY CHRGNG THE PHOTOCNDCTIVE INSULATNG LAYER OF A XEROGRAPHIC PLATE. JULY 1, 1969.

3,481,669.—PHOTO-CHARGING OF XEROGRAPHIC PLATES. DEC. 2, 1969. AUS. 0420860, BEL. 0705167, CAN. 0814631, FRA. 1541297, GER. 1522683, GRB. 1088073, JAP. 0517512.

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972.

3,751,155.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. AUG. 7, 1973.

3,809,472.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. MAY 7, 1974. ARG. 0196103, AUS. 0466757, BEL. 0793559, CHL. 0027991, FRA. 7246234, GRB. 1415170, ITL. 0973319, JAP. 0552841, MEX. 0131207, NZL. 0169421, PRU. 0013334, PTG. 0058769, SAF. 0729132, SPN. 0410172, STZ. 0552841, SWD. 7216970.

3,845,307.—COMBINED CORONA AND LUMINESCENT DISCHARGE. OCT. 29, 1974. BEL. 0811310, GRB. 1433663.

3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.

3,893,419.—BACKGROUND REDUCTION TECHNIQUE. JULY 8, 1975.

3,984,842.—DEVICE FOR CONTINOUS ELECTROSTATIC REPRODUCTION OF AN OPTICAL IMAGE. OCT. 5, 1976.

3,994,000.—DEVICE FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE USING A CHARGE STORAGE GRID. NOV. 23, 1976.

4,005,438.—DEVICE WITH CONTROL GRID FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE. JAN. 25, 1977.

Class 4

4,162,118.—WAVEGUIDE IMAGING SYSTEM. JULY 24, 1979.

Class 4A

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

4,068,950.—VARIABLE PLATEN COVER. JAN. 17, 1978.

4,111,541.—EXPOSURE SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. SEPT. 5, 1978.

4,120,579.—IMAGING SYSTEM FOR A PHOTOCOPYING DEVICE. OCT. 17, 1978.

Class 4A 1

3,330,180.—ILLUMINATION CONTROL SYSTEM. JULY 11, 1967. ARG. 0151653, BRA. 0084295, CAN. 0785137, FRA. 1450157, GER. 1264239, GRB. 1122629, ITL. 0730678, JAP. 0508404, MEX. 0078870.

3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.

3,487,252.—CESIUM LIGHT SOURCE. DEC. 30, 1969.

3,504,969.—IMAGING APPARATUS. APR. 7, 1970.

3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.

3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.

3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

3,733,599.—TRIGGERING APPARATUS FOR A FLASH LAMP. MAY 15, 1973. CAN. 0937281, GRB. 1361073.

3,746,442.—ELECTROPHOTOGRAPHIC IMAGING APPARATUS. JULY 17, 1973.

3,767,956.—APERTURE FLUORESCENT LAMP FOR COPYING MACHINES. OCT. 23, 1973.

3,777,135.—ILLUMINATION SYSTEM. DEC. 4, 1973.

3,779,640.—HEATING APPARATUS FOR SCAN LAMP. DEC. 18, 1973. ITL. 0995677.

3,781,585.—LIGHT PRODUCING SYSTEM. DEC. 25, 1973.

3,824,013.—LIGHT SOURCE ALIGNMENT DEVICE. JULY 16, 1974.

3,851,201.—LAMP ASSEMBLY. NOV. 26, 1974.

3,868,182.—LAMP ASSEMBLY. FEB. 25, 1975.

3,869,205.—ILLUMINATION SOURCE FOR XEROGRAPHIC EXPOSURE. MAR. 4, 1975.

3,881,817.—OPTICAL ALIGNMENT SYSTEM FOR AN ORIGINAL DOCUMENT. MAY 6, 1975. CAN. 3881817.

3,893,754.—COMBINATION PARABOLOID-ELLIPSOID MIRROR SYSTEM. JULY 8, 1975.

3,904,290.—OPTICAL SYSTEM ALIGNMENT APPARATUS. SEPT. 9, 1975.

3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.

3,914,649.—PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. OCT. 21, 1975.

3,961,222.—SODIUM VAPOR LAMP CONFIGURATION. JUNE 1, 1976.

3,967,893.—AN ILLUMINATING APPARATUS. JULY 6, 1976.

3,983,441.—MULTIPLE PINCH INCANDESCENT LAMP. SEPT. 28, 1976.

3,992,108.—OPTICAL SYSTEM ALIGNMENT APPARATUS. NOV. 16, 1976.

3,998,539.—AN ILLUMINATION SYSTEM. DEC. 21, 1976.

4,005,332.—EFFICIENT DC OPERATED FLUORESCENT LAMPS. JAN. 25, 1977.

4,005,940.—OPTICAL SYSTEM ALIGNMENT APPARATUS. FEB. 1, 1977.

4,071,798.—SODIUM VAPOR LAMP WITH EMISSION APERTURE. JAN. 31, 1978.
4,071,799.—SODIUM VAPOR LAMP WITH EMISSION APERTURE. JAN. 31, 1978.
4,072,417.—EXPOSURE DEVICE FOR A XEROGRAPHIC COPYING MACHINE. FEB. 7, 1978.
4,080,545.—SODIUM VAPOR LAMP. MAR. 21, 1978.
4,086,010.—ILLUMINATION SYSTEM UTILIZING TWO OPPOSING DC LAMPS WITH AN OPTIMUM BARREL-SHAPED SLIT. APR. 25, 1978.
4,113,379.—ILLUMINATION APPARATUS FOR ELECTRONIC COPYING MACHINES. SEPT. 12, 1978.
4,128,332.—ILLUMINATOR. DEC. 5, 1978. GRB. 1494424.
4,140,385.—LOW PRESSURE METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. FEB. 20, 1979.

Class 4A 2

3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,930,724.—MASKING APPARATUS FOR A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JAN. 6, 1976.

Class 4A 2A

3,062,110.—EXPOSURE STATION APPARATUS. NOV. 6, 1962. CAN. 0701636, JAP. 0318676.
3,560,089.—PLATEN COVER. FEB. 2, 1971. BEL. 0736415, CAN. 0910104, FRA. 0024759, GRB. 1245543, ITL. 8691460, JAP. 0674392.
3,560,090.—PLATEN COVER. FEB. 2, 1971. CAN. 0910103.
3,615,134.—COUNTERBALANCED AND SELF-CLOSING PLATEN COVER. OCT. 26, 1971. ARG. 0185533, AUS. 0449673, BEL. 0756482, CAN. 0921744, CHL. 0025836, EGR. 0084323, FRA. 7035445, GRB. 1318753, GUA. 0002610, ITL. 0908279, MEX. 0116804, PLD. P143518, PNM. 0002181, SPN. 0384046, STZ. 0515525, TIW. 0006830, USR. 0439097.
3,642,371.—PLATEN COVER FOR COPYING MACHINE. FEB. 15, 1972. ARG. 0189873, BEL. 0768991, CAN. 0938485, FRA. 7124554, ITL. 0932443.
3,642,376.—REMOVABLE PLATEN COVER. FEB. 15, 1972. CAN. 0926919.
3,685,905.—COMBINED DOCUMENT FEED AND BOOK COPYING APPARATUS. AUG. 22, 1972. ARG. 0189167, BEL. 0782370, CAN. 0954579, FRA. 7214327, GRB. 1382646, ITL. 0959701, MEX. 0127002, VZL. 30688.
3,788,737.—LUMINESCENT COVER. JAN. 29, 1974. FRA. 7336535.
3,813,161.—PLATEN COVER. MAY 28, 1974.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,914,049.—OPTICAL SCANNING SYSTEM. OCT. 21, 1975. BEL. 0815416.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,936,172.—LIQUID CRYSTALLINE PLATEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 3, 1976.
3,997,265.—PLATEN COVER. DEC. 14, 1976.
4,045,218.—METHOD FOR ELECTROSTATICALLY PRODUCING A COLOR ACCENTED PHOTOCOPY. AUG. 30, 1977.
4,072,418.—DEVICE FOR PREVENTING MOVEMENT OF AN ORIGINAL DOCUMENT ON A RECIPROCATING COPIER PLATEN. FEB. 7, 1978.
4,111,540.—FIELD LENS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 5, 1978.
4,118,119.—FACETTED EDGE FADEOUT REFLECTOR. OCT. 3, 1978.

Class 4A 3

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,672,759.—ILLUMINATION CONTROL SYSTEM. JUNE 27, 1972.
3,775,008.—OPTICAL SCANNING APPARATUS. NOV. 27, 1973.
3,829,209.—IMAGE REGISTRATION IN A MULTIPLE MAGNIFICATION PHOTOCOPY INH SYSTEM. AUG. 13, 1974. ARG. 0194481, BEL. 0784522, CAN. 0988146, FRA. 7220688, GRB. 1397446, ITL. 0956415, MEX. 0128160, SPN. 403.700, STZ. 0563605, SWD. 7207535.
3,926,518.—OPTICAL SCANNING SYSTEM. DEC. 16, 1975.
3,947,117.—EXPOSURE CONTROL SYSTEM. MAR. 30, 1976.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,995,954.—EXPOSURE SYSTEM. DEC. 7, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,080,071.—EXPOSURE DEVICE OF A COPYING MACHINE. MAR. 21, 1978.
4,098,552.—COPYING MACHINE. JULY 4, 1978.
4,101,807.—METHOD AND APPARATUS FOR CONTROLLING THE TEMPERATURE OF LOW PRESSURE METAL OR METAL HALIDE. JULY 18, 1978.

Class 4B

3,912,387.—ELECTROSTATOGRAPHY. OCT. 14, 1975.
3,967,894.—A SCREENED OPTICAL SYSTEM. JULY 6, 1976.
3,967,895.—ILLUMINATION CONTROL SYSTEM. JULY 6, 1976.
3,981,577.—AN OPTICAL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 21, 1976.
3,994,723.—ELECTROPHOTOGRAPHIC PROCESS INVOLVING STEP OF SUBSEQUENT DISCHARGE OF AREAS RECEIVING INSUFFICIENT. NOV. 30, 1976.
4,134,671.—INTERSECTING OPTICAL AND COPY SHEET PATH METHOD AND APPARATUS. JAN. 16, 1979.

Class 4B 1

3,062,094.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962. JAP. 0286655.
3,062,095.—PROJECTOR OPTICAL SCANNING SYSTEM. NOV. 6, 1962. CAN. 0706050.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,137,202.—OPTICAL SCANNING APPARATUS FOR XEROGRAPHIC PRINTERS. JUNE 16, 1964. CAN. 0685880.
3,221,622.—OPTICAL SCANNING SYSTEM. DEC. 7, 1965. ADN. 0000471, ARG. 0150818, ATR. 0267325, AUS. 0402541, BEL. 0657557, BRS. 00J3737, BRU. 0000469, CAN. 0756354, EIR. 0028649, FIJ. 0000342, FIN. 0045258, FRA. 1420763, GER. 1497089, GHA. 0000994, GIB. 1089536, GIE. 0006969, GRB. 1089536, GRK. 0029663, GUR. 1089536, HGK. 0009169, HOL. 0146615, ISR. 0022618, ITL. 0742392, JAP. 0599246, JER. 0000P96, KEN. 0001744, LXB. 0047657, MAU. 1927571, MLS. 0015069, NIG. 0001619, NOR. 0118726, NZL. 0140371, PTG. 0043364, SAF. 0646113, SBH. 0005269, SGP. 0008269, SHL. 0000017, SLN. 2677286, SPN. 0307501, SRK. 0000389, STZ. 0450920, SWD. 0338716, UGD. 0000269.
3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798356, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,484,163.—SCANNING SYSTEM. DEC. 16, 1969. CAN. 0840630.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.

3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157352, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,612,679.—SCANNING APPARATUS. OCT. 12, 1971. GRB. 1307918.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,794,418.—IMAGING SYSTEM. FEB. 26, 1974.
3,832,057.—SCANNING APPARATUS. AUG. 27, 1974. GRB. 1417255.
3,858,976.—OPTICAL SCANNING SYSTEM. JAN. 7, 1975.
3,869,204.—SCANNING OPTICAL SYSTEM. MAR. 4, 1975. BEL. 0815215.
3,905,247.—CLUTCHES. SEPT. 16, 1975.
3,918,806.—DASHPOT FOR COPIER OPTICAL SCANNING. NOV. 11, 1975.
3,936,173.—OPTICAL SYSTEM. FEB. 3, 1976.
3,948,374.—CLUTCHES. APR. 6, 1976.
3,950,091.—APPARATUS FOR CONTROLLING MOVEMENT OF A CARRIAGE. APR. 13, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,989,369.—SCANNING MECHANISM FOR A COPYING APPARATUS. NOV. 2, 1976.
4,027,961.—COPIER/RASTER SCAN APPARATUS. JUNE 7, 1977.
4,032,231.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM. JUNE 28, 1977. BEL. 0843419.
4,054,359.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR USING PULLEYS. OCT. 18, 1977.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,067,640.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR. JAN. 10, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.
4,068,950.—VARIABLE PLATEN COVER. JAN. 17, 1978.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,093,374.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE. JUNE 6, 1978. BEL. 843419, GRB. 1500877, SPN. 449267.
4,095,880.—EXTENDED RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE. JUNE 20, 1978. BEL. 843419, GRB. 1500877, SPN. 449267.
4,143,311.—HYSTERESIS SYNCHRONOUS MOTOR RATE SERVO SYSTEM. MAR. 6, 1979.
4,161,359.—APPARATUS FOR SYNCHRONIZING MOVEMENT BETWEEN AN OPTICAL SCANNING SYSTEM AND AN IMAGING MEMBER. JULY 17, 1979.

Class 4B 1A

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.
3,438,704.—ILLUMINATION CONTROL SYSTEM. APR. 15, 1969. CAN. 0865838, GRB. 1209473, JAP. 1002842.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,640,615.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 8, 1972. ARG. 0174792, AUS. 0428440, BEL. 0723948, CAN. 0884439, FRA. 1596660, GRB. 1223428, ITL. 0847541, JAP. 0992414, MEX. 0108966, PNM. 0001806, SPN. 0360210, SWD. 0352456, VZL. 0023711.
3,652,157.—MICROFILM PROJECTION APPARATUS. MAR. 28, 1972. CAN. 0937797, GRB. 1324097.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,778,147.—ELECTROSTATIC REPRODUCTION MACHINE HAVING SLEECTSBLE MAGNIFICATIONRATIOS. DEC. 11, 1973. CAN. 989464.
3,788,740.—IMAGING SYSTEM. JAN. 29, 1974.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,994,580.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION. NOV. 30, 1976.
4,008,958.—OPTICAL SYSTEM FOR EFFECTED IMAGE ROTATION. FEB. 22, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,029,409.—MULTI-MODE OPTICAL SCANNING SYSTEM. JUNE 14, 1977. BEL. 0843153, HAT. 0001524.
4,088,401.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING AD JACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE I. MAY 9, 1978.
4,103,991.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION PROVIDING 180 ROTATION OF IMAGE. AUG. 1, 1978.
4,134,670.—HIGH CAPACITY PHOTOCOPY OPTICAL SCANNING SYSTEM. JAN. 16, 1979.

Class 4B 1A 1

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,881,369.—BI-AXIAL POSITIONER. MAY 6, 1975.
3,912,392.—SHORT FOCAL LENGTH OPTICAL SCANNING SYSTEM. OCT. 14, 1975.

Class 4B 1A 2

3,496,846.—SCRIPTWRITER USING FIBER OPTIC BUNDLE. FEB. 24, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,681,777.—RECORDING APPARATUS. AUG. 1, 1972.

Class 4B 1A 3

3,120,790.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 11, 1964. AUS. 0270483, FRA. 1333280, GER. 1204066, GRB. 1019291, ITL. 0674895, JAP. 0468454.
3,497,296.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 24, 1970.
3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.
3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.
3,914,040.—REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. OCT. 21, 1975.
3,958,877.—HALF-TONE SCREEN WITH CLEANING MEANS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAY 25, 1976.
3,961,847.—AN ARCUATE SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 8, 1976.
3,961,848.—AN ELECTROPHOTOGRAPHIC PRINTING MACHINE WITH HALFTONE SCREEN CLEANING. JUNE 8, 1976.
3,963,342.—CURVED SCREEN. JUNE 15, 1976.
3,973,953.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.

3,973,954.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,957.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT. AUG. 10, 1976.
3,973,958.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR ELEMENT. AUG. 10, 1976.
4,003,649.—ELECTROPHOTOGRAPHIC HALFTONE PRINTING MACHINE EMPLOYING A PHASE SCREEN. JAN. 18, 1977.
4,007,981.—DUAL MODE ELECTROSTATOGRAPHIC PRINTING MACHINE. FEB. 15, 1977.
4,012,137.—AN OPTICAL SYSTEM HAVING A ROTATING SCREEN. MAR. 15, 1977.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,030.—HALF-TONE IMAGING WITH FLYING SPOT SCANNER SYSTEM. MAR. 22, 1977.
4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.
4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.
4,035,070.—APPARATUS AND METHOD FOR OPTICAL GENERATION OF A STRUCTURED CHARGE-DISCHARGE PATTERN ON A PHOTO. JULY 12, 1977.
4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.
4,072,414.—SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 7, 1978.
4,080,055.—A HALF-TONE COLOR COPIER. MAR. 21, 1978.
4,083,632.—MULTI FREQUENCY SCREEN. APR. 11, 1978.
4,090,786.—MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. MAY 23, 1978.
4,095,889.—EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 20, 1978.
4,108,654.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A DOCUMENT SCREEN. AUG. 22, 1978. FRA. 7514227. GRB. 1490898.
4,111,542.—COLLATING SYSTEM FOR OPAQUE DOCUMENTS AND SLIDE REPRODUCTIONS. SEPT. 5, 1978.
4,130,841.—VARIABLE FREQUENCY HALF-TONE IMAGING APPARATUS. DEC. 19, 1978.

Class 4B 1A 4

3,424,525.—MICROFILM COPIER TACHMENT. JAN. 28, 1969.
3,542,468.—MICROFILM ENLARGER-COPIER MICROFILM ATTACHMENT. NOV. 24, 1970. CAN. 0858250.
3,547,533.—MICROFILM REPRODUCTION MACHINE. DEC. 15, 1970. BEL. 0689227, CAN. 0891072, FRA. 1498788, GRB. 1160904, ITL. 0794772, MEX. 0095144.
4,046,473.—PHOTORECEPTOR METHOD AND SYSTEM. SEPT. 6, 1977.

Class 4B 2

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,698,807.—DISPLAYING AND PRINTING APPARATUS. OCT. 17, 1972. CAN. 0963521, GRB. 1376814.

Class 4B 3

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.

Class 4B 4

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.
3,995,950.—EXPOSURE SYSTEM FOR ELECTROSTATIC MACHINES. DEC. 7, 1976.
4,111,541.—EXPOSURE SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. SEPT. 5, 1978.

Class 4B 5

3,094,910.—REFLEX XEROGRAPHIC APPARATUS. JUNE 25, 1963. CAN. 0704293, GRB. 0997415.
3,212,417.—REFLEX EXPOSURE SYSTEM. OCT. 19, 1965. CAN. 0733682, GRB. 1052783, JAP. 0487026.
3,278,302.—PHOSPHORESCENT SCREEN REFLEX. OCT. 11, 1966. CAN. 0748828.

Class 4B 6

3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,355,236.—AUTOMATIC OPTICAL CONTROL APPARATUS. NOV. 28, 1967. CAN. 0771917.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,765,027.—ION LENS RECORDING SYSTEM. OCT. 9, 1973.
3,848,996.—PHOTOCOMPOSING APPARATUS. NOV. 19, 1974. BEL. 0815043.
3,901,585.—ZOOM LENS ASSEMBLY. AUG. 26, 1975. GRB. 1443481.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
3,947,188.—VARIABLE CONJUGATE OPTICAL SYSTEM. MAR. 30, 1976.
3,967,896.—VARIABLE EDGE FADEOUT APP FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.
3,998,540.—REPOSITIONING SYSTEM FOR VIEWING AND PROJECTION ELEMENTS OF A REPRODUCING APPARATUS. DEC. 21, 1976.
4,013,361.—OPTICAL APP AND REPRODUCING MACHINE. MAR. 22, 1977. BEL. 0843158.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,691.—VARIABLE MAGNIFICATION REPRODUCING APPARATUS. JULY 5, 1977.
4,033,692.—MULTI-MODE REPRODUCING MACHINE. JULY 5, 1977. HAT. 0001504.
4,046,467.—ZOOM LENS COPIER. SEPT. 6, 1977.

4,053,221.—MULTI-MODE REPRODUCING APPARATUS. OCT. 11, 1977.
4,060,324.—LENS SWITCHING MECHANISM FOR USE IN COPYING MACHINE. NOV. 29, 1977.
4,076,388.—ZOOM LENS ASSEMBLY. FEB. 28, 1978. GRB. 1443481.
4,076,416.—ILLUMINATION SLIT FOR AND A PROCESS OF USE THEREOF IN A REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1584.
4,076,417.—INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1604.
4,101,213.—ZOOM LENS COPIER. JULY 18, 1978.

Class 4B 6A

3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798056, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427, ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157052, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.
3,912,374.—SIX COMPONENT ZOOM LENS. OCT. 14, 1975.
4,047,811.—AVAILABLE LIGHT MARGINAL ILLUMINATION SYSTEM. SEPT. 13, 1977.
4,056,308.—VARIABLE FOCAL LENGTH REFLECTOR LENS SYSTEM. NOV. 1, 1977.
4,057,342.—ILLUMINATION SLIT FOR A REPRODUCING MACHINE. NOV. 8, 1977.
4,061,419.—VARIABLE MAGNIFICATION LENS SYSTEM. DEC. 6, 1977.
4,076,389.—ZOOM LENS MOUNT AND MECHANISM. FEB. 8, 1978.

Class 4B 7

3,470,797.—DISPLAY DEVICE. OCT. 7, 1969.
3,472,136.—CHARACTER GENERATOR. OCT. 14, 1969. CAN. 0884500, GRB. 1191881.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,615,132.—METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS. OCT. 26, 1971.
3,620,618.—MULTIPLE INPUT COPYING APPARATUS. NOV. 16, 1971.
3,775,007.—FORMS REPRODUCTION APPARATUS. NOV. 27, 1973.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.
4,157,869.—TRANSPARENCY REPRODUCING MACHINE. JUNE 12, 1979.

Class 4C

3,188,208.—SPECTRAL CONTRAST CONTROL IN XEROGRAPHY. JUNE 8, 1965.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,852,782.—IMAGING SYSTEM. DEC. 3, 1974.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,917,393.—VARIOSLIT. NOV. 4, 1975. BEL. 0820132.
3,970,382.—A SPATIALLY SELECTIVE OPTICAL SYSTEM. JULY 20, 1976. FRA. 7421348.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,066,351.—VARIABLE ILLUMINATION OPTICAL SYSTEM. JAN. 3, 1978.
4,118,122.—METHOD OF RENDERING OBJECTS UNCOPYABLE BY PHOTOCOPY PROCESSES. OCT. 3, 1978.
4,162,845.—COPIER FOR GREATER THAN STANDARD LENGTH DOCUMENTS. JULY 31, 1979.

Class 5

3,942,266.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. MAR. 9, 1976.
4,043,052.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. AUG. 23, 1977.

Class 5A 1

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,276,426.—CLOSED AEROSOL DEVELOPMENT. OCT. 4, 1966.
3,518,969.—DEVELOPMENT APPARATUS. JULY 7, 1970. CAN. 0852127, GRB. 1259879.
3,791,730.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 12, 1974.
3,795,443.—XEROGRAPHIC DEVELOPMENT. MAR. 5, 1974. GRB. 1255568, JAP. 0721852.
4,096,826.—MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS. JUNE 27, 1978.

Class 5A 1A

3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.
3,129,113.—AUTOMATIC POWDER APPLICATOR APPARATUS. APR. 14, 1964.
3,640,246.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGE. FEB. 8, 1972. ATR. 0319044, AUS. 0457007, BEL. 0758632, CAN. 0917404, FRA. 7042231, GRB. 1330[illegible], ITL. 0909113, JAP. 0815548, SPN. 0385187, STZ. 0527453, SWD. 0363411, USR. 0505386.
3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.
3,974,796.—DUAL MODE APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. AUG. 17, 1976.
4,033,292.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. JULY 5, 1977.

Class 5A 2

3,160,524.—APPARATUS FOR CHARGING POWDER PARTICLES AND APPLYING THE CHARGED PARTICLES TO A RECEIVING MEMBER. DEC. 8, 1964. CAN. 0779861, GRB. 1026457.
3,257,223.—ELECTROSTATIC POWDER CLOUD XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. JUNE 21, 1966. CAN. 0756559, GRB. 1028900, JAP. 0460474.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,357,403.—POWDER CLOUD DEVELOPMENT APPARATUS. DEC. 12, 1967.

3,470,009.—POWDER CLOUD DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 30, 1969. CAN. 0820240, FRA. 1461941, GRB. 1130452, HOL. 0142253, ITL. 0750148, JAP. 0512653, MEX. 0085176.
3,707,390.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. DEC. 26, 1972.
3,767,446.—DEVELOPMENT METHOD WITH OSCILLATING BRUSH PAD. OCT. 23, 1973.

Class 5A 3

RE.28,183.—POWDER CLOUD. OCT. 1, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
RE.28,193.—POWDER CLOUD XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 8, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.
3,648,901.—POWDER CLOUD XEROGRAPHIC DVLMNT APP-REISSUED AS 28183 AND 28193 10/74. MAR. 14, 1972. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
3,799,113.—HYBRID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. MAR. 26, 1974. CAN. 0980634, GRB. 1411708.
4,057,340.—SINGLE COMPONENT COLOR DEVELOPMENT SYSTEM. NOV. 8, 1977.

Class 5A 3A

3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

Class 5A 3B

3,599,604.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 17, 1971. ARG. 0187552, ATR. 0300574, AUS. 0427548, BEL. 0726572, BUL. 0017289, CAN. 0882577, DNK. 0122194, EGR. 0074431, EIR. 0032989, FRA. 1597322, GRB. 1248671, GRK. 0039920, IND. 0120485, ISR. 0031892, ITL. 0854007, LXB. 0058261, MEX. 0108936, NZL. 0155879, PAK. 0121035, PLP. 0006856, PNM. 0001804, PTG. 0051418, RHD. 1406967, RMN. 0054927, SAF. 0069181, SPN. 0362359, STZ. 0493015, UAR. 0009253, VTM. 0001857, VZL. 0023728.
3,633,544.—TURBO-CLOUD DEVELOPMENT. JAN. 11, 1972. CAN. 0934959, GRB. 1322363, JAP. 0741518.
3,670,701.—TWO STEP ORBITAL PAD DEVELOPMENT. JUNE 20, 1972. CAN. 0092849, GRB. 1313870, JAP. 0743834.
3,882,822.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. MAY 13, 1975.

Class 5A 5

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. CAN. 0834674, GRB. 107147, JAP. 0788652.
3,483,679.—FILTER APPARATUS. DEC. 16, 1969. BEL. 0708648, CAN. 0853503, FRA. 1552363, ITL. 0837050.
3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, FRA. 7401161, GRB. 1434673, ITL. 1003370.
3,937,570.—CLOUD SUPPRESSION IN AN ELECTROSTATIC COPYING APPARATUS. FEB. 10, 1976. CAN. 0974751, GRB. 1396922.

Class 5B

3,103,445.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON A XEROGRAPHIC PLATE. SEPT. 10, 1963, GRB. CAN. 0705363, GRB. 0956358.
3,251,706.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. MAY 17, 1966. CAN. 0629542, FRA. 1120534, GER. 1020234, GRB. 0774433.
3,357,402.—ROTARY BRUSH DEVELOPMENT. DEC. 12, 1967. ARG. 0167329, ATR. 0279354, AUS. 0416581, BEL. 0708497, BRA. 0088306, CAN. 0859029, FRA. 1548189, GER. 1597901, GRB. 1200068, HUN. 0156541, ITL. 0819626, JAP. 0608703, MEX. 0106260, PLD. 0071357, SPN. 0348633, SWD. 0328190, VZL. 0023686.
3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,558,339.—METHOD OF AND APPARATUS FOR STIPPLING. JAN. 26, 1971. CAN. 0871649, GRB. 1266969.
3,574,301.—DEVELOPING APPARATUS. APR. 13, 1971. AUS. 0449350, BEL. 0748073, CAN. 0873249, FRA. 7011549 GRB. 1303493, ITL. 0899146, JAP. 0715126, STZ. 0518579, SWD. 0356379, USR. 0331581.
3,592,167.—APPARATUS FOR LOADING TONER ON A DEVELOPING BRUSH. JULY 13, 1971.
3,613,638.—MATERIALS FOR FIBROUS DEVELOPMENT. OCT. 19, 1971. CAN. 0910736.
3,632,370.—MULTIPLE BRUSH DEVELOPMENT. JAN. 4, 1972.
3,636,924.—FUR BRUSH DEVELOPING APPARATUS. JAN. 25, 1972. CAN. 0912811, GRB. 1340060, JAP. 0751882.
3,638,613.—TONER DEVELOPER SYSTEM. FEB. 1, 1972. AUS. 0445403, BEL. 0747124, CAN. 0889762, EGR. 0081783, FRA. 7007651, GRB. 1294603, ITL. 0898243, SPN. 0377302, STZ. 0520960, SWD. 0354363, TIW. 0006827.
3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.
3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.
3,847,306.—DEVELOPING APPARATUS. NOV. 12, 1974. CAN. 0966998, GRB. 1353651.

Class 5C

3,648,657.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. MAR. 14, 1972.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,854,449.—DEVELOPMENT APPARATUS. DEC. 17, 1974. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414805, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,967,892.—A DEVELOPMENT SYSTEM. JULY 6, 1976.
3,981,272.—MAG BRUSH HOUSING WITH DETACHABLE SUMP SECTION. BEL. 0835755. SEPT. 21, 1976.
3,998,537.—SPLIT DEVELOPER HOUSING WITH INTERLOCKED FLOW GATE & CATCH. DEC. 21, 1976. BEL. 0835370.
4,027,621.—DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. JUNE 7, 1977.
4,039,102.—DEVELOPER DOOR WITH USE COUNTER ON DOOR. AUG. 2, 1977.
4,095,883.—MAGNETIC MIXING APPARATUS AND PROCESS. JUNE 20, 1978.
4,118,115.—ROLL DEVELOPER DRIVE. OCT. 3, 1978.
4,146,323.—AUGER FOR A DEVELOPMENT SYSTEM. MAR. 27, 1979.

Class 5C 1

3,113,042.—XEROGRAPHIC APPARATUS WITH MAGNETIC CONVEYOR. DEC. 3, 1963. CAN. 0738917, GRB. 0987985.
3,176,652.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 6, 1965. CAN. 0737851, GRB. 1018787, JAP. 0627140.
3,570,453.—DEVELOPMENT APPARATUS. MAR. 16, 1971. ARG. 0181813, AUS. 0429322, BEL. 0737102, CAN. 0885918, CZC. 0161861, EGR. 0081317, FRA. 6927184, GRB. 1256282, ITL. 0869726, JAP. 0716364, SPN. 0370289, STZ. 0496263, SWD. 0353165, TIW. 0005357, USR. 0380031.
3,572,288.—DEVELOPMENT APPARATUS. MAR. 23, 1971. CAN. 0885917.
3,572,289.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAR. 3, 1971.
3,575,139.—ELECTROSTATIC MAGNETIC DEVELOPER UNIT GATING APPARATUS. APR. 20, 1971. CAN. 0930538.
3,583,364.—DEVELOPMENT APPARATUS. JUNE 8, 1971. BEL. 0738574, CAN. 0883725, FRA. 6930427, GRB. 1273187, ITL. 0871550, JAP. 0674394.
3,608,522.—XEROGRAPHIC DEVELOPMENT CONTROL APPARATUS. SEPT. 28, 1971. CAN. 0911704.

3,640,248.—ELECTROSTATIC MAGNETIC DEVELOPING APPARATUS—MULTIPLE MAGNETIC BRUSH UNIT. FEB. 8, 1972. ARG. 0184080, ATR. 0312419, AUS. 0437486, BEL. 0751486, BRA. 0088030, CAN. 0929337, CHL. 0026193, EGR. 0084331, FRA. 7020260, GRB. 1251477, ITL. 0893838, MEX. 0117951, NOR. 0133049, PNM. 0002537, SAF. 0703774, SPN. 0380378, STZ. 0509614, SWD. 0359664, TIW. 0007168, USR. 0419061, VZL. 0025834.

3,641,980.—DEVELOPMENT APPARATUS. FEB. 15, 1972. ARG. 0185081, AUS. 0445430, BEL. 0757698, CAN. 0913354, EGR. 0085713, FRA. 7038237, GRB. 1273456, ITL. 0909031, JAP. 0720627, MEX. 0118187, SPN. 0384576, STZ. 0516183, SWD. 0362510, TIW. 0006205.

3,665,891.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAY 30, 1972. CAN. 0914904, GRB. 1347138, JAP. 783770.

3,683,406.—MAGNETIC INCREMENTAL CASCADE DEVELOPMENT SYSTEM. AUG. 8, 1972. CAN. 0945200, GRB. 1335995, JAP. 0752521.

3,690,912.—METHOD FOR MAGNETIC DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE. SEPT. 12, 1972.

3,697,050.—CROSS MIXING BAFFLE. OCT. 10, 1972. CAN. 0951110.

3,709,713.—METHOD FOR MAGNETIC DEVELOPMENT. JAN. 9, 1973.

3,724,422.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 3, 1973. ARG. 0190744, AUS. 0457858, BEL. 0776598, CAN. 0951111, EGR. 0097962, FRA. 7145341, GRB. 1373010, ITL. 0943877, MEX. 0124647, SPN. 0397854, SWD. 0365880, USR. 0459904.

3,788,275.—MAGNETIC SHIELDING APPARATUS. JAN. 29, 1974. BEL. 0801242, CAN. 0973703, GRB. 1438332, ITL. 0990692.

3,828,728.—XEROGRAPHIC DEVELOPMENT SYSTEM. AUG. 13, 1974. BEL. 0791193, CAN. 0980635, FRA. 7240058, GRB. 1413337, ITL. 0970350, SWD. 7214311.

3,866,564.—MAGNETIC BRUSH DEVELOPING APPARATUS FOR COPIERS. FEB. 18, 1975.

3,872,830.—MAGNETIC BRUSH DEVELOPING APPARATUS. MAR. 25, 1975.

3,880,517.—REPRODUCTION MACHINE DEVELOPER APPARATUS. APR. 29, 1975.

3,880,518.—FLOATING DEVELOPER PLATEN FOR REPRODUCTION APPARATUS. APR. 29, 1975.

3,887,367.—METHOD FOR TEMPERATURE STABLIZING PHOTORECEPTORS. JUNE 3, 1975.

3,893,815.—MAGNETIC BRUSH SUPPORT MEMBER. JULY 8, 1975.

3,906,121.—ELECTROSTATIC DEVELOPMENT METHOD USING MAGNETIC BUSH CONFIGURATION TRANSPORT. SEPT. 16, 1975. CAN. 0970631, GRB. 1381049.

3,906,898.—MAGNETIC BRUSH DEVELOPING APPARATUS. SEPT. 23, 1975.

3,911,864.—TONER PRELOADED MAGNETIC BRUSH DEVELOPMENT SYSTEM. OCT. 14, 1975. BEL. 0809859, STZ. 0568594.

3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

3,921,577.—MAGNETIC DEVELOPMENT UNIT. NOV. 25, 1975.

3,926,516.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.

3,927,640.—DEVELOPER SHUT-OFF APPARATUS. DEC. 23, 1975.

3,934,549.—TRANSFER APPARATUS. JAN. 27, 1976.

3,945,342.—MAGNETIC BRUSH SUPPORT MEMBER. MAR. 23, 1976.

3,948,217.—MAGNETIC BRUSH DEVELOPMENT SYSTEM WITH FLOATING DEVELOPMENT ROLLS. APR. 6, 1976. BEL. 0835370.

3,949,704.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 13, 1976.

3,950,089.—COATED ROLL FOR MAGNETIC BRUSH DEVELOPMENT & CLEANING SYSTEMS. APR. 13, 1976.

3,953,121.—ARTICULATED DEVELOPMENT APPARATUS. APR. 27, 1976. IRN. 0013434.

3,962,003.—METHOD OF FORMING MAGNETIC BRUSH SUPPORT MEMBER. JUNE 8, 1976.

3,968,773. JULY 13, 1976.

3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.

3,991,713.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. NOV. 16, 1976.

3,996,892.—SPATIALLY PROGRAMMABLE ELECTRODE TYPE ROLL FOR ELECTROSTATOGRAPHIC PROCESSORS AND THE LIKE. DEC. 14, 1976.

4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

4,033,294.—DEVELOPER MIXING AND TRANSPORTING AUGER FOR MAGNETIC BRUSH DEVELOPING APPARATUS. JULY 5, 1977.

4,034,709.—AN IMPROVED DEVELOPER ROLL. JULY 12, 1977.

4,044,719.—DEVELOPING APPARATUS IN ELECTROCOPYING MACHINES. AUG. 30, 1977.

4,050,413.—MAGNETIC BRUSH CROSSMIXING SYSTEM. SEPT. 27, 1977.

4,057,666.—MAGNETIC BRUSH DEVELOPER ROLL FOR ELECTROSTATIC REPRODUCTION MACHINES. NOV. 8, 1977.

4,077,358.—DEACTIVATING DEVICE FOR A MAGNETIC BRUSH DEVELOPER USED IN A MULTICOLOR ELECTROPHOTOGRAPHIC. MAR. 7, 1978.

4,078,520.—VIBRATING SCREEN FILTER FOR TONER DENSITY MEASURING APPARATUS. MAR. 14, 1978.

4,084,542.—POSITIONING APPARATUS FOR MAGNETIC BRUSH DEVELOPING DEVICE. APR. 18, 1978.

4,086,006.—PURGING SYSTEM FOR A DEVELOPMENT APPARATUS. APR. 25, 1978.

4,096,826.—MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS. JUNE 27, 1978.

4,098,228.—HIGH SPEED MAGNETIC BRUSH DEVELOPMENT SYSTEM. JULY 4, 1978.

4,116,555.—BACKGROUND REMOVAL APPARATUS. SEPT. 26, 1978.

4,117,803.—DEVELOPER FLOW REGULATOR FOR A MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 3, 1978.

4,118,115.—ROLL DEVELOPER DRIVE. OCT. 3, 1978.

4,127,327.—APPARATUSES INCORPORATING A COMPOSITE SUPPORT MEMBER. NOV. 28, 1978.

4,131,357.—SEQUENTIALLY ACTIVATED DEVELOPMENT SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTER. DEC. 26, 1978.

4,155,329.—MAGNETIC BRUSH DEVELOPING DEVICE. MAY 22, 1979.

Class 5C 1A

3,584,601.—MAGNETIC BRUSH BELT DEVELOPMENT. JUNE 15, 1971. CAN. 0884799, GRB. 1238277.

3,592,166.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. JULY 13, 1971. CAN. 0887598, GRB. 1275822, JAP. 1162298.

3,638,614.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0929338, GRB. 1304236, JAP. 0808219.

3,741,790.—METHOD FOR MAGNETICALLY DEVELOPING ELECTROSTATIC IMAGES. JUNE 26, 1973.

3,823,688.—MAGNETIC BRUSH ASSEMBLY. JULY 16, 1974. BEL. 0794507, CAN. 0989607, FRA. 7302247, GRB. 1394502, SWD. 7301014.

3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 1B

3,532,071.—DEVELOPMENT APPARATUS. OCT. 6, 1970. CAN. 0883763, GRB. 1227549, JAP. 0650630.

3,552,355.—DEVELOPMENT APPARATUS. JAN. 5, 1971. ARG. 0175330, ATR. 0300575, AUS. 0441519, BEL. 0730371, CAN. 0914005, CZC. 0161850, DNK. 0129880, EGR. 0077412, EIR. 0032786, FRA. 6909741, GRB. 1263566, GRK. 0039919, IND. 0120212, ISR. 0031757, ITL. 0860255, LXB. 0058295, MEX. 0111374, NOR. 0128037, NZL. 0155695, PAK. 0120989, PLD. 0017651, PLP. 0006606, PNM. 0001723, PTG. 0051392, RHD. 1156947, SAF. 0691728, SPN. 0365439, STZ. 0499140, SWD. 0341530, TIW. 0006602, UAR. 0009242, USR. 0383338, VTM. 0001829, VZL. 0023745.

3,645,770.—METHOD FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 29, 1972.

3,893,414.—METHOD AND APP FOR VARYING DEVELOPER BANDWIDTH. JULY 8, 1975.

3,908,596.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. SEPT. 30, 1975.

3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.

3,990,393.—APPARATUS FOR DEPOSITING MAGNETIC MATERIAL ON AN IMAGE BEARING MEMBER. NOV. 9, 1976.

3,998,184.—A DEVELOPMENT APPARATUS. DEC. 21, 1976.

4,025,179.—PASSIVE CROSS MIXING SYSTEM. MAY 24, 1977.

Class 5C 2

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.
4,053,218.—DEVELOPMENT SYSTEM. OCT. 11, 1977.
4,082,061.—MULTI-COLOR DEVELOPMENT SYSTEM. APR. 4, 1978.
4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.
4,131,357.—SEQUENTIALLY ACTIVATED DEVELOPMENT SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTER. DEC. 26, 1978.

Class 5C 3

3,906,897.—DEVELOPMENT APPARATUS. SEPT. 23, 1975. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,940,272.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. FEB. 24, 1976. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
4,102,305.—DEVELOPMENT SYSTEM WITH ELECTRICAL FIELD GENERATING MEANS. JULY 25, 1978.
4,150,173.—PROCESS OF PREPARING TRANSPARENT COLORED MAGNETIC MATERIALS. MAY 17, 1979.

Class 5D

3,768,904.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. OCT. 30, 1973.
3,793,985.—IMAGING SYSTEM. FEB. 26, 1974.
3,924,944.—SPLIT DEVELOPER HOUSING. DEC. 9, 1975.
4,015,561.—ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSOR. APR. 5, 1977.
4,095,883.—MAGNETIC MIXING APPARATUS AND PROCESS. JUNE 20, 1978.

Class 5D 1

3,219,014.—MECHANICAL SHIELD TO PROTECT MAGNETIC CORE IN XEROGRAPHIC DEVELOPING APPARATUS. NOV. 23, 1965. CAN. 0757573, FRA. 1393298, GER. 1497076, GRB. 1034099, ITL. 0710188, JAP. 0477812.
3,685,488.—XEROGRAPHIC DEVELOPMENT. AUG. 22, 1972.
3,884,571.—LEAKAGE DEVELOPER RECIRCULATION. MAY 20, 1975. HOL. 3884571.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

Class 5D 1A

3,067,720.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 11, 1962. ARG. 0175377, BEL. 0750689, PNM. 0002011, VZL. 0025828.
3,095,325.—TONER DISPENSER DRIVE MECHANISMS. JUNE 25, 1963.
3,190,264.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 22, 1965. CAN. 0733036.
3,303,817.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 14, 1967.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.
3,635,553.—CASCADE DEVELOPING APPARATUS UTILIZING A ROTARY WHEEL WITH SCOOPS. JAN. 18, 1972.
3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,678,896.—CONVEYOR SYSTEM. JULY 25, 1972. CAN. 0952465, GRB. 1325831.

Class 5D 1B

3,122,454.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 25, 1964.
3,435,803.—LIFTING APPARATUS. APR. 1, 1969. CAN. 0937394, FRA. 1511169, GER. 1456806, GRB. 1165378, ITL. 0788954, JAP. 0542586, MEX. 0095039.
3,448,724.—DEVELOPING APPARATUS. JUNE 10, 1969. ARG. 0174576, AUS. 0430081, BEL. 0726573, CAN. 0884214, CZC. 0157054, EGR. 0077413, FRA. 1598024, GRB. 1258781, ITL. 0854008, JAP. 0665972, MEX. 0107603, PNM. 0001429, RMN. 0054735, SAF. 0069179, SPN. 0362358, STZ. 0486057, SWD. 0338507, USR. 0410595, VZL. 0023716.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,606,533.—XEROGRAPHIC DEVELOPMENT. SEPT. 20, 1971.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,835,811.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 17, 1974.
3,888,578.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 10, 1975.
3,900,255.—PADDLE-WHEEL DEVELOPMENT SYSTEM. AUG. 19, 1975.

Class 5D 1C

3,117,891.—XEROGRAPHIC APPARATUS. JAN. 14, 1964. CAN. 0740394, GRB. 1006078.
3,287,150.—CASCADE DEVELOPMENT PROCESS W/TWO-COMPONENT DEVELOPER. NOV. 22, 1966.
3,415,224.—MAGNETIC CASCADE DEV APPARATUS. DEC. 10, 1968. AUS. 0423497, BEL. 0725943, CAN. 0852660, COR. 000948A, EGR. 0074432, FRA. 1603904, GRB. 1217281, ITL. 0849521, LXB. 0057873, MRC. 0014726, PTG. 0051108, SAF. 0688440, SPN. 0361840, STZ. 0493872, SWD. 0345753, SYA. 0002440, ZMB. 0166972.
3,667,427.—CASCADE APPARATUS. JUNE 6, 1972. CAN. 0951112, GRB. 1377152.
3,678,897.—DEVELOPER MIXING APPARATUS. JULY 25, 1972. BEL. 0778426, CAN. 0951113, FRA. 7203212, GRB. 1377151, ITL. 0946909.
3,741,372.—CONVEYOR FOR DEVELOPER APPARATUS. JUNE 26, 1973.

Class 5D 1D

3,550,555.—XEROGRAPHIC DEVELOPER SEPARATION. DEC. 29, 1970. CAN. 0855652, GRB. 1238032.

Class 5D 2

3,105,770.—CASCADE DEVELOPMENT IMPROVEMENT. OCT. 1, 1963. AUS. 0252867, BEL. 0749545, CAN. 0746453, FRA. 1286397, GER. 1278244, GRB. 0986844, ITL. 0648862, JAP. 0517396.
3,375,807.—XEROGRAPHIC DEVELOPER. APR. 2, 1968. CAN. 0819049, MEX. 0092092, VZL. 0024448.
3,542,579.—ELECTROSTATIC IMAGE DEVELOPMENT. NOV. 24, 1970.
3,973,517.—DEVELOPMENT DEVICE AND METHOD. AUG. 10, 1976.

Class 5D 3

3,057,324.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 9, 1962.
3,336,905.—XEROGRAPHIC DEVELOPER APPARATUS. AUG. 22, 1967. CAN. 0793223, GRB. 1123059, JAP. 0508405.
3,428,025.—XEROGRAPHIC DEVELOPMENT APPARATUS-POWDER CLOUD BY CHARGE BREAKDOWN. DEC. 18, 1969.
3,638,610.—DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0916432, FRA. 7041622.

3,638,611.—ELECTRODED DEVELOPMENT DEVICE. FEB. 1, 1972. ARG. 0184658, ATR. 0308537, AUS. 0446323, BEL. 0752936, CAN. 0913893, CHL. 0025914, DNK. 0129305, EGR. 0084129, FRA. 7024067, GRB. 1258738, GUA. 0002615, IND. 0127311, ITL. 0900196, JAP. 0719143, MEX. 0115403, NOR. 0130134, NZL. 0160644, PLD. 0081287, PLP. 0006288, PNM. 0002266, PTG. 0054072, SAF. 0704532, SPN. 0381383, STZ. 0520961, SWD. 0359386, TIW. 0005923, USR. 0414818.

3,682,132.—AUTOMATIC DEVELOPER CONTROLLER. AUG. 8, 1972.

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3,347,691.—XEROGRAPHIC DEVELOPMENT. OCT. 17, 1967. ARG. 0168482, CAN. 0827608, FRA. 1497061, GRB. 1166464, ITL. 0788454, JAP. 0589492, MEX. 0093822, VZL. 0032595.

3,412,710.—CLEAN UP ELECTRODE. NOV. 26, 1968. BEL. 0704923, CAN. 0867283, FRA. 1540699, GRB. 1196637, ITL. 0814605, JAP. 0585018.

3,620,191.—BIASED INPUT CHUTE. NOV. 16, 1971. ARG. 0199542, ATR. 0324837, AUS. 0446250, BEL. 0752943, CAN. 0918411, CHL. 0025871, DNK. 0128800, EGR. 0083704, FRA. 7024665, GRB. 1310444, GUA. 0002727, IND. 0127313, ITL. 0900192, JAP. 0731612, MEX. 0114979, NOR. 0132115, NZL. 0160647, PLP. 0008638, PNM. 0002269, PTG. 0054075, SAF. 70/4534, SPN. 0381382, STZ. 0528761, SWD. 0359387, TIW. 0007164, USR. 0358874.

3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.

3,682,538.—XEROGRAPHIC PICK-OFF PLATE. AUG. 8, 1972. ARG. 0186267, BEL. 0764562, CAN. 0935635, FRA. 7110750, GRB. 1349272, ITL. 0922348, MEX. 0119677, USR. 0426387.

3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.

3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.

3,807,997.—PLURAL ELECTRODE DEVELOPMENT METHODS FOR LATENT ELECTROSTATIC IMAGES. APR. 30, 1974. CAN. 0979299, GRB. 1381910.

3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.

3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.

3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.

Class 5D 5

3,223,548.—XEROGRAPHIC DEVELOPING MACHINE AND METHOD. DEC. 14, 1965.

3,316,878.—CASCADE DEVELOPING APPARATUS. MAY 2, 1967.

Class 5E

3,357,399.—COMBINED FLUIDIZED BED AND INVERTED CASCADE DEVELOPMENT APPARATUS. DEC. 12, 1967. ARG. 0171121, CAN. 0821473, CHL. 0022944, MEX. 0096075, PRU. 0009332, URG. 0008548, VZL. 0021060.

3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.

3,748,126.—MULTIPLE COPY SELECTIVE RE-WETTING PRINTING. JULY 24, 1973.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

3,865,611.—METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY CONDUCTIVE. FEB. 11, 1975.

3,893,854.—PHOTOGRAPHIC ARTICLES WITH GAPS FOR PROCESSING FLUIDS. JULY 8, 1975.

3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975, GRB. 1438660.

3,927,934.—ELECTROSTATOGRAPHIC REPRODUCTION MACHINES. DEC. 23, 1975.

3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.

3,951,653.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. APR. 20, 1976.

3,973,699.—LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON. AUG. 10, 1976, GRB. 1455885.

3,974,554.—QUANDRANGULAR TRIHETICORD GRAVURE ROLL. AUG. 17, 1976, BEL. 0841855.

3,978,817.—PATTERNED GRAVURE & DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 08418?5.

3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.

4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.

4,020,788.—DOCTORING MEANS. MAY 3, 1977.

4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

4,024,834.—TEMPERATURE COMPENSATED DOCTOR BLADE. MAY 24, 1977. GRB. 1430518.

4,037,952.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. JULY 26, 1977.

4,068,938.—ELECTROSTATIC COLOR PRINTING USING DISCRETE POTENTIALS. JAN. 17, 1978. GRB. 1442234.

4,126,711.—CHARGE PATTERN DEVELOPMENT METHOD & APPARATUS. NOV. 21, 1978. GRB. 1484712.

4,161,360.—LIQUID DEVELOPMENT APPARATUS. JULY 17, 1979.

Class 5E 2

3,068,115.—ELECTROSTATIC EMULSION DEVELOPMENT. DEC. 11, 1962. GER. 1302344, GRB. 1006230, JAP. 0466442.

3,730,708.—ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER. MAY 1, 1973.

3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.

3,862,618.—LIQUID DEVELOPING APPARATUS DEVELOPING AN ELECTROSTATIC IMAGE. JAN. 28, 1975.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

4,007,401.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.

Class 5E 3

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

Class 5E 4

3,064,622.—IMMERSION DEVELOPMENT. NOV. 20, 1962. CAN. 0729544, FRA. 1296944, GER. 1190787, GRB. 0990968, JAP. 0451638.

3,129,115.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 14, 1964. GRB. 1008004.

3,251,688.—LIQUID TRANSFER DEVELOPMENT. MAY 17, 1966. CAN. 0765523, FRA. 1362253, GRB. 1032013.

3,270,637.—ELECTROVISCOUS RECORDING. SEPT. 6, 1966. AUS. 0403009, CAN. 0740112, FRA. 1414126, GER. 1497109, GRB. 1086197, HOL. 0141644, ITL. 0738077, JAP. 0508403, NOR. 0127882, STZ. 0472710, SWD. 0331032.

3,281,241.—METHOD OF FORMING A VISUAL RECORD OF A LATENT IMAGE RECEIVING WEB. OCT. 25, 1966. AUS. 0275028, CAN. 0766420, FRA. 1362254, GER. 1303008, GRB. 1035236, ITL. 0699412, JAP. 0470426.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,334,613.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 8, 1967. CAN. 0787870, GRB. 1125628, JAP. 0546654.

3,369,918.—DEV OF LATENT ELECTROSTATIC IMGS W/ CREATED WAVES OF LIQUID DEVELOPER. FEB. 20, 1968.

3,576,623.—DEVELOPMENT SYSTEM EMPLOYING A CORONODE IMMERSED IN A LIQUID DEVELOPER. APR. 27, 1971. AUS. 0434437, CAN. 0872191, GER. 1908292, GRB. 1259880, JAP. 0675662.

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TONER-FREE ZONE. MAY 4, 1971.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,627,410.—REPRODUCTION APPARATUS WITH LIQUID. DEC. 14, 1971. CAN. 0886508.

3,627,557.—LIQUID DVLPMNT BY REDUCING VISCOSITY OF DVLPR ON ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.
3,642,471.—LIQUID DEVELOPING PROCESS IN AN ELECTROSTATOGRAPHIC IMAGING SYSTEM. FEB. 15, 1972.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.
3,672,884.—ELECTROSTATIC PRINTING. JUNE 27, 1972.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.
3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.
3,808,025.—LIQUID DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. APR. 30, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,619.—ELECTRO-PHOTOGRAPHIC APPARATUS. JAN. 28, 1975.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,870,514.—LIQUID DEVELOPMENT FOR THE ELECTRONIC PHOTOGRAPHY. MAR. 11, 1975.
3,877,934.—INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT. APR. 15, 1975.
3,890,040.—INDUCTION IMAGING APPARATUS. JUNE 17, 1975.
3,913,524.—LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 21, 1975.
3,926,825.—LIQUID DEVELOPER COMPOSITION AND PROCESS FOR PREPARING SAME. DEC. 16, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, 0033335.
3,943,268.—LIQUID DEVELOPER PROCESS AND APP FOR ELECTROSTATOGRAPHY. MAR. 9, 1976. CAN. 0904683.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,970,043.—ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT. AUG. 20, 1976.
3,971,659.—COLOR ELECTROPHOTOGRAPHIC PROCESS USING PHOTO CONDUCTIVE PARTICLES IN LIQUID DEVELOPER. JULY 27, 1976.
3,972,305.—IMAGING SYSTEM. AUG. 3, 1976. CAN. 0904683.
3,976,808.—IMAGING SYSTEMS. AUG. 24, 1976.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

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3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,372,027.—XEROGRAPHIC LIQUID DEVELOPMENT. MAR. 5, 1968. CAN. 0800963, GRB. 1091169, ITL. 0760712, JAP. 0571175.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,667,428.—DEVELOPING SYSTEMS. JUNE 6, 1972. ARG. 0195534, ATR. 0312420, AUS. 0456202, BEL. 0752805, CAN. 0904107, CHL. 0026274, CZC. 0164275, DNK. 0126528, EGR. 0083514, FRA. 7024066, GRB. 1320232, ITL. 0894827, JAP. 0745765, MEX. 0114978, PNM. 0002541, SAF. 0704475, SPN. 0194607, STZ. 0543753, SWD. 0366126, TIW. 0006616, USR. 0420196.
3,676,215.—IMAGING SYSTEM. JULY 11, 1972. ARG. 0182525, AUS. 0430692, BEL. 0732139, CAN. 0900770, FRA. 6913232, GRB. 1272306, ITL. 0857440, JAP. 0698292, MEX. 0109289, PNM. 0001433, SPN. 0386902, SWD. 0352117, USR. 0309549.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,795,530.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT. MAR. 5, 1974.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.
3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, VZL. 0033335.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.
3,978,817.—PATTERNED GRAVURE AND DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,985,663.—CONDUCTIVE INKS CONTAINING QUATERNARY AMMONIUM COMPOUNDS. OCT. 12, 1976.
3,993,023.—COATED FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,993,024.—FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,004,931.—CONSTANT VISCOSITY INKS. JAN. 25, 1977.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.

4,042,415.—METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE. AUG. 16, 1977.

4,043,657.—BLADE FOR METERING LIQUID DEVELOPER. AUG. 23, 1977. GRB. 1501464.

4,047,943.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER. SEPT. 13, 1977.

4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.

4,059,444.—LIQUID DEVELOPMENT USING CONDUCTIVE INKS. NOV. 22, 1977. GRB. 1495785.

4,089,683.—LIQUID DEVELOPER CLEANING MEANS. MAY 16, 1978.

4,105,445.—RESILIENT ARCUATE SURFACE CONTAINING PHOTOCONDUCTOR. AUG. 8, 1978. GRB. 1476355.

Class 5F

3,124,483.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. MAR. 10, 1964. CAN. 0843622.

3,166,432.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0675704, FRA. 1260844, GER. 1185062, GRB. 0959668, JAP. 0401040.

3,203,394.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 31, 1965. CAN. 0757572, GER. 1497070, GRB. 1026704, JAP. 0464922.

3,216,844.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES WITH PHOTOCONDUCTIBLE DONOR MEMBER. NOV. 9, 1965. CAN. 0794035, GRB. 1024983.

3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.

3,332,396.—XEROGRAPHIC DEVELOPING APPARATUS WITH CONTROLLED CORONA MEANS. JULY 25, 1967. AUS. 0287695, BEL. 0656893, CAN. 0775061, FRA. 1419973, GER. 1288915, GRB. 1060679, ITL. 0745583.

3,375,806.—XEROGRAPHIC DONOR DEVELOPMENT APPARATUS. APR. 2, 1968.

3,376,852.—DIELECTRIC BELT DEVELOPING. APR. 9, 1968. CAN. 0859028, GRB. 1214512, JAP. 0919364.

3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.

3,606,864.—DONOR ASSEMBLY. SEPT. 21, 1971. CAN. 0903461, GRB. 1280951, MEX. 0116025.

3,613,636.—ELECTROGRAPHIC DEVELOPER. OCT. 19, 1971. GRB. 1282991.

3,635,196.—PNEUMATICALLY CONTROLLED SEAL. JAN. 18, 1972.

3,645,618.—VACUUM NOZZLE TO REMOVE AGGLOMERATES ON A TONER APPLICATOR. FEB. 29, 1972. CAN. 0949823.

3,696,783.—AUTOMATED TOUCHDOWN DEVELOPMENT SYSTEM. OCT. 10, 1972. CAN. 0949822, GRB. 1373666.

3,696,785.—DEVELOPMENT APPARATUS. OCT. 10, 1972. CAN. 0949824, GRB. 1373665.

3,697,169.—ELECTROSTATIC RECORDING APPARATUS AND METHOD. OCT. 10, 1972. CAN. 0954292, GRB. 1322681.

3,703,157.—MTHD/APPRTS FOR FRMNG UNFRM LYR OF PWDR DVELPR ON A SURFACE. NOV. 21, 1972.

3,707,389.—LATENT ELECTROSTATIC IMAGE DEVELOPMENT. DEC. 26, 1972. AUS. 0457281, BEL. 0777721, CAN. 0949827, FRA. 7201007, GRB. 1375048, ITL. 0946354.

3,729,334.—IMAGING PROCESS. APR. 24, 1973.

3,739,748.—DONOR FOR TOUCHDOWN DEVELOPMENT. JUNE 19, 1973.

3,759,222.—MICROFIELD DONOR WITH CONTINUOUSLY REVERSING MICROFIELDS. SEPT. 18, 1973. BEL. 0780091, CAN. 0951596, FRA. 7208102, GRB. 1385966, ITL. 0949779.

3,848,566.—DONOR APPARATUS. NOV. 19, 1974.

3,866,574.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 18, 1975, FRA. 7405248, GRB. 1458766.

3,881,927.—HALF TONE DEVELOPMENT PROCESS FOR TOUCHDOWN SYSTEM IN ELECTROSTATIC IMAGING. MAY 6, 1975. GRB. 1419926.

3,884,185.—COATED WIRE DEVELOPER BRUSH. MAY 20, 1975.

3,890,929.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 24, 1975.

3,893,418.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.

3,900,002.—DONOR APPARATUS. AUG. 19, 1975.

3,914,460.—DEVELOPMENT UTILIZING ELECTRIC FIELDS. OCT. 21, 1975.

3,929,098.—TONER LOADING FOR TOUCHDOWN DONOR. DEC. 30, 1975.

3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.

3,997,688.—DEVELOPING AN ELECTRICAL IMAGE. DEC. 14, 1976.

3,998,185.—MICROFIELD DONORS WITH TONER AGITATION AND THE METHODS OF THEIR MANUFACTURE. DEC. 21, 1976.

3,999,515.—SELF SPACING MICROFIELD DONORS. DEC. 28, 1976.

3,999,849.—TOUCHDOWN AMBIPOLAR DEVELOPMENT. DEC. 28, 1976.

4,003,333.—DEVELOPMENT SYSTEM. JAN. 18, 1977.

4,006,981.—HALF TONE DEVELOPMENT FOR TOUCHDOWN SYSTEM. FEB. 8, 1977. GRB. 1419926.

4,011,834.—TOUCHDOWN ELECTROSTATIC DEVELOPMENT APPARATUS. MAR. 15, 1977.

4,017,648.—TONER AGITATION THROUGH MICROFIELD DONOR. APR. 12, 1977.

4,025,185.—APPLICATOR MEMBER. MAY 24, 1977. GRB. 1436098.

4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.

4,067,295.—MAGNETIC MICROFIELD DONOR SYSTEM. JAN. 10, 1978.

4,092,165.—METHOD OF MAKING A DONOR MEMBER MOLD. MAY 30, 1978.

4,105,445.—RESILIENT ARCUATE SURFACE CONTAINING PHOTOCONDUCTOR. AUG. 8, 1978. GRB. 1476355.

4,114,261.—METHOD OF MANUFACTURE OF A XEROGRAPHIC MICROFIELD DONOR. SEPT. 19, 1978. GRB. 1515938.

4,136,637.—CONTINUOUS CONTRAST DEVELOPMENT SYSTEM. JAN. 30, 1979.

4,144,061.—TRANSFER DEVELOPMENT USING A FLUID SPACED DONOR MEMBER. MAR. 13, 1979.

4,149,486.—TRANSFER DEVELOPMENT APPARATUS USING SELF-SPACING DONOR MEMBER. APR. 17, 1979.

Class 5G

3,380,437.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT APPARATUS. APR. 30, 1968. ARG. 0179553, BRA. 0088502, CAN. 0821491, CHL. 0022941, CLB. 0016330, MEX. 0095936, PRU. 0009315, URG. 0008636, VZL. 0020996.

3,393,663.—FLUIDIZING ELECTRODE DEVELOPMENT APPARATUS. JULY 23, 1968. ARG. 0171118, AUS. 0411962, BEL. 0701467, CAN. 0821472, CHL. 0024009, CLB. 0017645, CZC. 0157025, DNK. 0123998, EGR. 0072982, FRA. 1531274, GRB. 1193443, ISR. 0028298, ITL. 0805956, LXB. 0054062, MEX. 0095697, NOR. 0127834, NZL. 0149432, PLD. 0069038, PTG. 0048069, SAF. 0674268, SPN. 0343103, STZ. 0481406, SWD. 0322414, USR. 0353449, VZL. 0021059.

3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.

3,574,660.—ORBITAL DEVELOPER STREAM DEVELOPMENT. APR. 13, 1971. CAN. 0845076, GRB. 1193277.

3,641,977.—APPARATUS FOR AGITATING DEVELOPER MATERIAL WITHIN A HOUSING. FEB. 15, 1972. CAN. 0917405, GRB. 1342684.

3,682,137.—J-SHELL DEVELOPER HOUSING. AUG. 8, 1972. CAN. 0949820, GRB. 1342782.

3,900,001.—DEVELOPING APPARATUS. AUG. 19, 1975. CAN. 0970631, GRB. 1381049.

Class 5H

3,484,265.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT METH. DEC. 16, 1969.

3,503,776.—XEROGRAPHIC DEVELOPMENT. MAR. 31, 1970. CAN. 0828694, FRA. 1511809, GRB. 1182291, ITL. 0793692, MEX. 0098765.

3,611,991.—VIBRATING BED DEVELOPING APPARATUS WITH ELECTROMAGNETIC DEVELOPER AGITATOR.

OCT. 12, 1971. AUS. 0445409, BEL. 0755605, CAN. 0911707, EGR. 0083516, FRA. 7032503, GRB. 1264780, ITL. 0907435, JAP. 0745766, SPN. 0383333, STZ. 0521615, SWD. 0361956, TIW. 0007201, USR. 0371738.

3,613,637.—DEVELOPER FOR ELECTROSTATIC IMAGES. OCT. 19, 1971. AUS. 0448238, BEL. 0752034, CAN. 0911702, FRA. 7021987, GRB. 1301157, ITL. 0894180, SWD. 0358975.

3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.

3,623,454.—FLUIDIZED BED DEVELOPMENT APPARATUS. NOV. 30, 1971. CAN. 0895208, GRB. 1272373, JAP. 0731616.

3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.

3,685,486.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 22, 1972. CAN. 0921693, GRB. 1316306, JAP. 0746925.

3,754,531.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 28, 1973.

3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

Class 51

3,838,922.—APPARATUS FOR SENSING THE QUANTITY OF RECLAIMED DEVELOPER MATERIAL. OCT. 1, 1974. CAN. 0992600, GRB. 1414319.

3,841,265.—DEVELOPER ASSEMBLY FOR ELECTROSTATIC COPIER. OCT. 15, 1974.

3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.

4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

Class 51 1

3,316,875.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 2, 1967.

3,331,355.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 18, 1967. CAN. 0793224, FRA. 1465811, GRB. 1069351, ITL. 0778708.

3,349,750.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 31, 1967. CAN. 0819050, FRA. 1516053, GRB. 1165377, ITL. 0788953, JAP. 0547202, MEX. 0093862.

3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.

3,550,556.—DEVELOPMENT APPARATUS. DEC. 29, 1970. ARG. 0180677, AUS. 0442279, BEL. 0726571, BRA. 6905449, CAN. 0882576, CZC. 0157055, EGR. 0076888, FRA. 1604314, GRB. 1252494, ITL. 0854006, JAP. 0731247, MEX. 0109983, PNM. 0001770, RMN. 0054558, SAF. 0069180, SPN. 0362037, STZ. 0498431, SWD. 0351059, USR. 0372851, VZL. 0023724.

3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.

3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.

3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.

3,687,270.—CONVEYOR ASSEMBLY. AUG. 29, 1972. CAN. 0952464, GRB. 1376231.

3,717,122.—MAGNETIC GATE. FEB. 20, 1973. CAN. 0960031, GRB. 1377023.

3,943,887.—HYBRID CROSSMIXER. MAR. 16, 1976.

3,947,107.—PARTIALLY SUBMERGED ACTIVE CROSSMIXER. MAR. 30, 1976. BEL. 0835370.

3,973,518.—CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE. AUG. 10, 1976.

3,995,590.—BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS. DEC. 7, 1976.

3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.

4,040,386.—RETRACTABLE EDGE SEALS FOR ELECTROSTATOGRAPHIC DEVELOPMENT SYSTEMS. AUG. 9, 1977.

4,056,076.—DEVELOPER MIXING SYSTEM. NOV. 1, 1977.

Class 51 2

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.

3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.

4,011,835.—TONER CONVEYOR. MAR. 15, 1977.

4,133,458.—TONER DISPENSER ARRANGEMENT. JAN. 9, 1979.

4,133,459.—DEFORMABLE TONER DISPENSER WITH FLOW RATE CONTROLLER. JAN. 9, 1979.

4,135,642.—WIPER ARRANGEMENT FOR TONER LEVEL SENSOR. JAN. 23, 1979.

4,142,655.—TONER DISPENSING AND SUPPLY ARRANGEMENT. MAR. 6, 1979.

Class 51 2A

3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.

3,135,433.—XEROGRAPHIC TONER DISPENSING APPARATUS. JUNE 2, 1964. CAN. 0701240.

3,149,760.—POWDER DISPENSING APPARATUS. SEPT. 22, 1964.

3,250,439.—XEROGRAPHIC TONER DISPENSER. MAY 10, 1966. CAN. 0815453, GRB. 1126197, JAP. 0512654.

3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.

3,385,500.—TONER PACKAGE. MAY 28, 1968. CAN. 0864337, GRB. 1189147, JAP. 0931680.

3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

3,622,054.—TONER DISPENSER IMPROVEMENT. NOV. 23, 1971. CAN. 0911705.

3,722,471.—TONER METER DEVICE. MAR. 27, 1973. CAN. 0951108, GRB. 1370009.

3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.

3,920,155.—PARTICLE LEVEL INDICATOR. NOV. 18, 1975.

3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.

3,941,470.—A TONER PARTICLE DISPENSER. MAR. 2, 1976.

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

3,954,331.—TONER DISPENSER. MAY 4, 1976.

3,979,022.—MONITORING DEVICE—MAGNETIC POWERED ALARM DEVICE. SEPT. 7, 1976. BEL. 0801607, CAN. 0982841, FRA. 7300103, GRB. 1431574, ITL. 0990693, SWD 7308931.

4,034,701.—PARTICLE DISPENSER0TONER DISPENSER—EPIC. JULY 12, 1977. BEL. 0801243, CAN. 0979209, FRA. 7323735, GRB. 1,438,799, ITL. 0990691, SWD. 7,308,929.

Class 51 2B

3,389,863.—XEROGRAPHIC TONER DISPENSER. JUNE 25, 1968. CAN. 0835862, FRA. 1497062, GRB. 1171303, ITL. 0787552, JAP. 0589523, MEX. 0093821, VZL. 0024004.

3,390,664.—XEROGRAPHIC TONER DISPENSING APPARATUS. JULY 2, 1968. CAN. 0852124, GRB. 1208593, JAP. 0608323.

3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

Class 51 2C

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

3,956,108.—ANTI-PLUGGING DEVICE FOR AUTOMATIC DEVELOPABILITY CONTROL SYSTEMS. MAY 11, 1976.

3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING & RECLAIMING TONER. MAY 25, 1976.

3,974,944.—TONER DISPENSER. AUG. 17, 1976.

4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

Class 51 2C 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.

3,300,101.—TONER DISPENSER. JAN. 24, 1967. CAN. 0800856, GRB. 1152671, JAP. 0524530.

3,339,807.—TONER CONTAINER AND DISPENSER. SEPT. 5, 1967. CAN. 0842133, GRB. 1165953, JAP. 0547201.

3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.

3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.

3,538,887.—ELECTROSCOPIC TONER POWDER DISPENSER. NOV. 10, 1970.

3,542,089.—TONER DISPENSER. NOV. 24, 1970. CAN. 0885916.

3,596,807.—DISPENSING APPARATUS—REISSUED D2184R RE27876. AUG. 3, 1971. CAN 0868818.

3,608,792.—APPARATUS FOR DISPENSING FINELY DIVIDED PARTICULATE MATERIAL. SEPT. 28, 1971. ARG. 0182132, ATR. 0311790, AUS. 0456817, BEL. 0745602, CAN. 0869923, CHL. 0025844, DNK. 0128336, FRA. 7003984, GRB. 1302401, GUA. 0002512, ITL. 0886722, MEX. 0119828, NZL. 0159117, PNM. 0002240, SAF. 0700806, SPN. 0376265, STZ. 0526801, SWD. 7001426, TIW. 0005927, VZL. 0032924.

3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.

3,655,033.—VIBRATORY BOWL—TONER DISPENSER. APR. 11, 1972.

3,752,576.—TRANSPORT FOR PARTICULATE MATERIAL. AUG. 14, 1973.

3,896,279.—TNE LVL DETCTR ASSEMBLY INC MAGNETICLY RESPONSIVE SWITCH ACTUATD BY DFERENTL LOADED BLADE TYPE. JULY 22, 1975.

3,901,187.—DEVELOPER RETONING APPARATUS. AUG. 26, 1975.

3,920,154.—TONER LEVEL DETECTOR. NOV. 18, 1975.

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

Class 5I 2C 2

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.

3,348,522.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799397, GRB. 1135743, JAP. 0942998, MEX. 0089292.

3,348,523.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799399, GRB. 1139299, JAP. 5371200.

3,376,853.—ELECTROSTATIC TONER CONTROL. APR. 9, 1968. CAN. 0819051, GRB. 1177232, JAP. 0568731.

3,376,854.—AUTOMATIC TONER DISPENSING CONTROL—SEE D2425 FOR RE27480. APR. 9, 1968. ARG. 0164003, ATR. 0279352, AUS. 0416453, BEL. 0699115, CAN. 0866349, CHL. 0022942, CLB. 0016441, CZC. 0160633, DNK. 0116114, EGR. 0067870, EIR. 0031100, FRA. 1524678, GRB. 1186775, GRK. 0033692, IND. 0110760, ISR. 0028022, ITL. 0796438, JAP. 0800113, LXB. 0053713, MEX. 0099990, NOR. 0128039, NZL. 0148850, PAK. 0118694, PLD. 0069794, PLP. 0005554, PRU. 0009348, PTG. 0047758, SAF. 0673111, SPN. 0340983, STZ. 0473409, SWD. 6707266, TRK. 0014624, UAR. 0008620, URG. 0008538, USR. 0494887, VZL. 0023661.

3,430,606.—ELECTROSCOPIC PARTICLE SENSOR. MAR. 4, 1969. BEL. 0726274, BRA. 6805010, CAN. 0891683, FRA. 1597321, ITL. 0866513, MEX. 0107599, PNM. 0001400, USR. 0336895, VZL. 0023727.

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.

3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

3,526,338.—METHOD AND CONTROLLER FOR DISPENSING ELECTROSCOPIC MATERIAL—AUTOMATIC TONER DISPENSER CONTROL—24. SEPT. 1, 1970. ARG. 0181603, AUS. 0436922, BEL. 0726274, BRA. 6804852, CAN. 0895526, GRB. 1216690, ITL. 0866513, JAP. 0752505, MEX. 0107687, PNM. 0001419, SPN. 0362036, SWD. 0355090, USR. 0336895, VZL. 0023723.

3,527,387.—DEVELOPER REPLENISHING PROGRAMMING SYSTEM. SEPT. 8, 1970. CAN. 0922772, GRB. 1233814, JAP. 0758340.

3,536,042.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 27, 1970.

3,604,939.—TONER SENSING APPARATUS—TONER SENSOR ASSEMBLY-GENIE. SEPT. 14, 1971. CAN. 0915751, GRB. 1260379, JAP. 0752502.

3,635,373.—AUTOMATIC DEVELOPABILITY CONTROL APPARATUS. JAN. 18, 1972. ARG. 0190708, AUS. 0445334, BEL. 0760748, CAN. 0923546, CHL. 0025916, EGR. 0091983, FRA. 7047630, GRB. 1336590, GUA. 0002624, ITL. 0913903, JAP. 0795149, MEX. 0116721, PNM. 0002092, SPN. 0386750, STZ. 0524843, SWD. 0362511, TIW. 0007197.

3,659,556.—PROGRAMMABLE TONER DISPENSER. MAY 2, 1972. BEL. 0771423, CAN. 0936681, FRA. 7130743, GRB. 1358448, ITL. 0934010.

3,692,403.—AUTOMATIC CONTROL OF TONER CONCENTRATIONS. SEPT. 19, 1972. CAN. 0979635, GRB. 1409578.

3,693,581.—TONER DISPENSER CIRCUIT FOR ELECTROSTATOGRAPHIC APPARATUS. SEPT. 26, 1972.

3,727,065.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM. APR. 10, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, FGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.

3,754,821.—AUTOMATIC DEVELOPMENT CONTROL. AUG. 28, 1973. ARG. 0195188, AUS. 0467463, BEL. 0793425, CAN. 1004725, FRA. 7246724, GRB. 1411448, ITL. 0972845, JAP. 0552838, MEX. 0128209, NZL. 0169419, SAF. 7219030, SPN. 0410096, STZ. 0552838, SWD. 7216891, VZL. 0032066.

3,757,999.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM FOR ELECTROSTATIC RECORDING APPARATUS. SEPT. 11, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, EGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.

3,778,146.—ILLUMINATING APPARATUS. DEC. 11 , 1973.

3,801,196.—TONER CONCENTRATION REGULATING APPARATUS. APR. 2, 1974.

3,814,516.—HUMIDITY COMPENSATED CONTROL DEVICE. JUNE 4, 1974. CAN. 1012202, GRB. 1458558.

3,825,337.—COLOR BALANCE DISPLAY. JULY 23, 1974. CAN. 1006766.

3,834,806.—PARTICLE LEVEL INDICATOR. SEPT. 10, 1974.

3,872,825.—PARTICLE CONCENTRATION DETECTOR. MAR. 25, 1975. CAN. 1014598.

3,873,002.—TONER DISPENSER LOGIC CONTROL. MAR. 25, 1975. BEL. 0813798, CAN. 1008915, GRB. 1457565, ITL. 1009837.

3,893,408.—TONER DISPENSER SYSTEM. JULY 8, 1975.

3,894,799.—APPARATUS FOR MONITORING COPY QUALITY. JULY 15, 1975.

3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

3,936,176.—DEVICE FOR MAINTAINING A DEVELOPABILITY REGULATING APPARATUS CONTAMINANT FREE. FEB. 3, 1976.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

3,969,114.—METHOD FOR MONITORING COPY QUALITY. JULY 13, 1976.

3,999,119.—MEASURING TONER CONCENTRATION. DEC. 21, 1976.

4,026,643.—APP & MTHD FOR MEASUREMENT OF THE RTO OF TNR PRTLCS ELCTRSTATC CHRGE TO TNR PRTLE MASS IN ELCTSTC. MAY 31, 1977.

4,032,225.—COPYING MACHINES. JUNE 28, 1977.

4,043,293.—DEVELOPABILITY REGULATING APPARATUS. AUG. 23, 1977.

4,076,149.—SLAVE DRIVER FOR TONER DISPENSER WITH STRIKER. FEB. 28, 1978.

4,079,266.—ELECTRONIC CONTROL FOR AUTOMATIC DEVELOPABILITY SYSTEM. MAR. 14, 1978.

4,082,445.—TONER CONTROL SYSTEM FOR AN ELECTROSTATIC REPRODUCTION MACHINE. APR. 4, 1978. BEL. 848542.

4,111,151.—MULTI-PARTICLE DEVELOPABILITY REGULATING SYSTEM. SEPT. 5, 1978.

4,113,371.—A COLOR DEVELOPMENT SYSTEM. SEPT. 12, 1978.

Class 5J

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.

3,908,037.—IMAGE DEVELOPING TECHNIQUES. SEPT. 23, 1975. CAN. 0980181, GRB. 1406292.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5J 1

3,091,219.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 28, 1963.
3,147,147.—XEROGRAPHIC DEVELOPING APPARATUS AND ELECTRODE. SEPT. 1, 1964. CAN. 0738918, GRB. 1007167.
3,241,466.—ELECTROSTATIC PHOTOGRAPHY. MAR. 22, 1966.
3,424,131.—ELECTRODED CASCADE DEVELOPMENT SYSTEM. JAN. 28, 1969. CAN. 0848084, FRA. 1463050, GER. 1497214, GRB. 1123618, ITL. 0729637, JAP. 0499007.
3,606,863.—DEVELOPMENT ELECTRODE. SEPT. 21, 1971. CAN. 0905099, GRB. 1296756, JAP. 0774497.
3,611,992.—CLEANUP ELECTRODE. OCT. 12, 1971. CAN. 0916431.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,648,658.—DEVELOPING APPARATUS. MAR. 14, 1972.
3,651,784.—LOW POTENTIAL DEVELOPMENT ELECTRODE. MAR. 28, 1972. CAN. 0917900.
3,670,700.—DEVELOPMENT ELECTRODE. JUNE 20, 1972. ARG. 0185528, ATR. 0324836, AUS. 0445848, BEL. 0752935, CAN. 0916430, CHL. 0025837, DNK. 0126729, EGR. 0085926, FRA. 7024671, GRB. 1304065, IND. 0127310, ITL. 0900194, JAP. 0731613, MEX. 0115164, NOR. 0131437, NZL. 0160642, PLP. 0006295, PNM. 0001951, PTG. 0054071, SAF. 0704531, SPN. 0381380, STZ. 0513439, SWD. 0358976, TIW. 0007161, USR. 0503555, VZL. 30684.
3,741,156.—XEROGRAPHIC DEVELOPMENT APPARATUS. JUNE 26, 1973.
3,778,144.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 11, 1973. CAN. 0972550, GRB. 1393144.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.
3,790,397.—RETONING CARRIER BEADS IN THE DEVELOPMENT ZONE. FEB. 5, 1974.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,955,976.—DEVELOPING METHOD IN ELECTROPHOTOGRAPHY-DEVELOPING METHOD IN ELECTROPHOTOGRAPHY. MAY 11, 1976. GRB. 1329143.

Class 5J 2

3,416,494.—XEROGRAPHIC DEVELOPMENT ELECTRODE. DEC. 17, 1968. CAN. 0882575, GER. 1816690, GRB. 1249664, JAP. 0653014.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.

Class 5J 3

3,349,676.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. OCT. 31, 1967. CAN. 0814087, FRA. 1473662, GER. 1522685, GRB. 1144766, ITL. 0764006, JAP. 0513609, MEX. 0090133.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

Class 5J 4

3,062,178.—XEROGRAPHIC DEVELOPING APPARATUS. NOV. 6, 1962.
3,105,777.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 1, 1963. CAN. 0700762.

Class 5J 5

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,611,982.—DEVELOPMENT ELECTRODE CONTROL APPARATUS. OCT. 12, 1971. ARG. 0185532, AUS. 0450067, BEL. 0755383, BRA. 0088402, CAN. 0913353, CHL. 0025834, EGR. 0090283, FRA. 7032350, GRB. 1303148, ITL. 0901777, JAP. 0758461, MEX. 0117918, PLD. 80986, PNM. 0002245, SPN. 0383058, STZ. 0523526, SWD. 0361750, TIW. 0007514, USR. 0473382, VZL. 0032598.
3,696,784.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 10, 1972. BEL. 0776601, CAN. 0951109, FRA. 7146241, GRB. 1369648, ITL. 0943905.
3,719,169.—PLURAL ELECTRODE DEVELOPMENT APPARATUS. MAR. 6, 1973. CAN. 0979299, GRB. 1381910.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,788,739.—IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES. JAN. 29, 1974.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,815,988.—IMAGE DENSITY CONTROL APPARATUS. JUNE 11, 1974. ARG. 0205710, BEL. 0815209, FRA. 7416693, GRB. 1458707, ITL. 1012346, SAF. 0743132.
3,818,864.—IMAGE DEVELOPING APPARATUS. JUNE 25, 1974. CAN. 0980181, GRB. 1406292.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
4,084,538.—AMBIENT TEMPERATURE COMPENSATING DEVICE FOR POWER SOURCE APPARATUS FOR DEVELOPING ELECTRODE. APR. 18, 1978.

Class 5K

3,212,889.—XEROGRAPHIC CONTRAST CONTROL. OCT. 19, 1965. GRB. 1008897.
3,251,685.—METHOD OF CONTROLLING CONTRAST IN A XEROGRAPHIC REPRODUCTION PROCESS. MAY 17, 1966. CAN. 0707047, GER. 1265583, JAP. 0446813.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,707,947.—CROSS-CHANNEL MIXER. JAN. 2, 1973. ARG. 0200109, ATR. 0322982, AUS. 0457444, BEL. 0776661, CAN. 0946145, CHL. 0027259, DNK. 0132048, EGR. 0099026, FRA. 7145340, GRB. 1372731, ITL. 0943876, MEX. 0127352, PNM. 0002585, SAF. 0718308, SPN. 0397852, STZ. 0557554, TIW. 0005832, USR. 0402245.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. CAN. 0991246, GRB. 1406794.
3,865,080.—TONER PICKOFF APPARATUS. FEB. 11, 1975. GRB. 1430876.
3,865,612.—XEROGRAPHIC DEVELOPMENT METHOD. FEB. 11, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABILIZING PHOTORECEPTORS. JUNE 3, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
3,893,413.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,911,865.—TONER PICKOFF APPARATUS. OCT. 14, 1975.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,994,725.—MEANS FOR ENHANCING REMOVAL OF BACKGROUND TONER PARTICLE. NOV. 30, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 5K 5

4,161,357.—PHOTORECEPTOR HEATING APPARATUS. JULY 17, 1979.

Class 5L

3,245,823.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. APR. 12, 1966.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

Class 5M

3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.

3,877,963.—REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING. APR. 15, 1975.

3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.

3,901,698.—METHOD OF REVERSAL DEVELOPMENT USING TWO ELECTROSTATIC DEVELOPERS. AUG. 26, 1975.

Class 5N

3,907,693.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY. SEPT. 23, 1975.

3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.

3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.

3,963,486.—ELECTROPHOTOGRAPHIC IMAGING PROCESS EMPLOYING EPOXY-ESTER CONTAINING LIQUID DEVELOPER. JUNE 15, 1976.

4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.

4,047,943.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER. SEPT. 13, 1977.

4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.

4,076,640.—PREPARATION OF SPHEROIDIZED PARTICLES. FEB. 28, 1978. SPN. 445496.

4,077,804.—METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS. MAR. 7, 1978.

Class 5N 1A

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065. JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 2131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 5N 1B

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 003270B, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062, PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, AUS. 0480033, BAH. 0000093, BEL. 0716083, BOL. 3399B, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0001940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065, JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 04[illegible] 7382.

3,948,654.—ELECTROSTATOGRAPHIC PROCESS. APR. 6, 1976.

3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. SEPT. 28, 1976. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.

4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.

4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.
4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES.
4,147,541.—ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT. APR. 3, 1979. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 5N 2

3,844,815.—FORON YELLOW AS A TONER COLORANT. OCT. 29, 1974. BEL. 808754, CAN. 1003264, FRA. 7345058, ITL. 1000870.
4,078,930.—DEVELOPER COMPOSITIONS COMPRISING TONER AND CARRIER. MAR. 14, 1978. FRA. 763634.

Class 5N 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.
3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.
3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.
3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.
3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TOWER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.
3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.
4,013,572.—HYBRID FIX SYSTEM INCORPORATING PHOTOGRADABLE POLYMERS. MAR. 22, 1977.
4,049,447.—IMAGING SYSTEM. SEPT. 20, 1977. ARG. 195092, AUS. 468938, BEL 791376, CAN. 986768, FRA 7239133, GRB. 1411446, ITL. 972536, MEX. 131270, SPN. 409973, STZ. 28528, VZL. 33138.
4,104,066.—COLD PRESSURE FIX TONERS FROM POLYCAPROLACTONE. AUG. 1, 1978.

Class 5N 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.
3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.
3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2A 2

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710, LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.
3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.
3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.
3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.
3,704,066.—REFLEX ESPOSURE MEDIUM. NOV. 28, 1972.
3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.
3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.
3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.
3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.
3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.
3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.
3,923,503.—ELECTROSTATIC LATEN IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.
4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.
4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.
4,065,305.—XEROGRAPHIC DEVELOPER. DEC. 27, 1977.

Class 5N 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 087389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.
3,526,533 —COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.
3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,833,366.—CARRIER COMPOSITIONS. SEPT. 3, 1974. BEL. 0748633, CAN. 0904641, FRA. 7012584, GRB. 1319787, ITL. 0899337, JAP. 0709043.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIERS PARTICLES. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,929,657.—STOICHIOMETRIC FERRITE CARRIERS. DEC. 30, 1975. BEL. 0819535.

3,945,823.—ELECTROSTATOGRAPHIC REVERSAL DEVELOPMENT WITH DEVELOPER COMPRISING POLY(P-XYLYLENE) COATED CARR. MAR. 23, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,947,371.—DEVELOPER MATERIAL WITH POLYPXYLYLENE-COATED CARRIER. MAR. 30, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

3,996,392.—HUMIDITY-INSENSIVE FERRITE DEVELOPER MATERIALS. DEC. 7, 1976. BEL. 0847571.

4,007,293.—MECHANICALLY VIABLE DEVELOPER MATERIALS. FEB. 8, 1977.

4.019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977.

4,039,331.—CARRIER BEAD COATING COMPOSITIONS. AUG. 2, 1977.

4,040,969.—HIGH SURFACE AREA CARRIER. AUG. 9, 1977. BEL. 829639, GRB. 1497732, SPN. 438084.

4,042,517.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER. AUG. 16, 1977.

4,042,518.—STOICHIOMETRIC FERRITE CARRIERS. AUG. 16, 1977. BEL. 819535, CAN. 1033978, FRA. 7429829, GRB. 1468841, SPN. 429670.

4,043,929.—ELECTROSTATOGRAPHIC CARRIER COMPOSITION. AUG. 23, 1977.

4,053,310.—DURABLE CARRIER COATING COMPOSITIONS COMPRISING POLYSULFONE. OCT. 11, 1978.

4,057,426.—MAGNETIC TONER WITH A COATED CARRIER. NOV. 8, 1977.

4,058,397.—YELLOW DEVELOPER E MPLOYING A COATED CARRIER. NOV. 15, 1978.

4,065,585.—RENEWABLE CHOW FUSER COATING. DEC. 27, 1977. GRB. 1490252.

4,066,563.—COPPER-TETRA-4-(OCTADECYLSULFONOMIDO) PHTHALOCYANINE ELECTROPHOTOGRAPHIC CARRIER. JAN. 3, 1978.

4,073,965.—YELLOW DEVELOPER EMPLOYING A COATED CARRIER AND IMAGING PROCESS USING SAME. FEB. 14, 1978.

4,076,893.—TRIBO MODIFIED CARRIER MATERIALS VIA ACYLATION. FEB. 28, 1978.

4,078,926.—IMAGING METHOD UTILIZING FUNCTIONALIZED CARRIER MATERIALS. MAR. 14, 1978.

4,079,166.—AMINOLYZED CARRIER COATINGS. MAR. 14, 1978.

4,092,163.—IMAGING PROCESS UTILIZING SILYLATED COATED CARRIER. MAY 30, 1978.

4,094,803.—DEVELOPER COMPOSITION COMPRISING AMINOLYZED COATED CARRIER. JUNE 13, 1978.

4,104,066.—COLD PRESSURE FIX TONERS FROM POLYCAPROLACTONE. AUG. 1, 1978.

4,122,024.—CLASSIFIED TONER MATERIALS. OCT. 24, 1978. BEL. 829719. CAN. 1043149. FRA. 7516758. GRB. 1497731.

4,124,385.—MAGNETIC GLASS CARRIER MATERIALS. NOV. 7, 1978.

4,124,735.—MAGNETIC GLASS CARRIER MATERIALS. NOV. 7, 1978.

4,125,667.—HIGH SURFACE AREA FERROMAGNETIC CARRIER MATERIALS. NOV. 14, 1978. BEL. 829639. CAN. 1041344. FRA. 7516181. GRB. 1497732. SPN. 438084. SWD. 75060434. USR. 623532.

4,126,437.—MAGNETIC GLASS CARRIER MATERIALS. NOV. 21, 1978.

4,126,454.—IMAGING PROCESS UTILIZING HIGH SURFACE AREA CARRIER MATERIALS. NOV. 21, 1978.

4,126,458.—INORGANIC REVERSAL CARRIER COATINGS. NOV. 21, 1978.

4,126,566.—ELECTROSTATIC DEVELOPER MATERIAL. NOV. 21, 1978. CAN. 1055761. GRB. 1494392.

4,147,540.—COLOR ELECTROPHOTOGRAPHIC DEVELOPER SYSTEM EMPLOYING ONE CARRIER HAVING A COATING OF RESIN. APR. 3, 1979. FRA. 7629316. GRB. 1526875.

4,152,279.—TRIBOELECTRIC MODIFIED CARRIER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAY 1, 1979.

4,156,607.—CARRIER COATED WITH ACYL MODIFIED STYRENE COPOLYMER, USED IN ELECTROSTATIC IMAGING PROCESS. MAY 29, 1979.

Class 5N 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

4,027,048.—ELECTROSTRATOGRAPHIC DEVELOPMENT. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,049,447.—IMAGING SYSTEM. SEPT. 20, 1977. ARG. 195092, AUS. 468938, BEL. 791376, CAN. 986768, FRA. 7239133, GRB. 1411446, ITL. 972536, MEX. 131270, SPN. 409973, STZ. 28528, VZL. 33138.

4,070,186.—TRIBO MODIFIED TONER MATERIALS VIA SILYLATION AND ELECTROSTATOGRAPHIC IMAGING PROCESS. JAN. 24, 1978.

4,070,296.—TRIBOELECTRICALLY CONTROLLED COVAL- ENTLY DYED TONER MATERIALS. JAN. 24, 1978.

4,078,931.—AMINOLYZED TONER COMPOSITIONS AND IMAGING PROCESS USING SAME. MAR. 14, 1978.

4,079,166.—AMINOLYZED CARRIER COATINGS. MAR. 14, 1978.

4,104,066.—COLD PRESSURE FIX TONERS FROM POLYCAPROLACTONE. AUG. 1, 1978.

4,113,482.—IMAGING COMPOSITIONS. SEPT. 12, 1978. CAN. 978790. GRB. 1418292.

4,134,760.—TRIBO MODIFIED TONER MATERIALS VIA ACYLATION. JAN. 16, 1979. GRB. 1525703.

4,135,925.—METHODS OF CHANGING COLOR BY IMAGE DISRUPTION. JAN. 23, 1979. CAN. 978790. GRB. 1418292.

4,139,483.—ELECTROSTATOGRAPHIC TONER COMPOSITION CONTAINING SURFACTANT. FEB. 13, 1979.

Class 5N 5A

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,804,619.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS. APR. 16, 1974. CAN. 1005678, FRA. 7345057, GRB. 1435218.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.
3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.
3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TONER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.
4,035,310.—YELLOW DEVELOPER. JULY 12, 1977.
4,052,207.—ELECTROSTATOGRAPHIC IMAGING PROCESS. OCT. 4, 1977. SPN. 450203.

Class 5N 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.
3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 5N 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.
3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5N 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635. CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,989,435.—APPARATUS FOR FABRICATING SPHERICALLY SHAPED PARTICLES OF SMALL DIAMETER. NOV. 2, 1976.
4,019,842.—APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS. APR. 26, 1977.
4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.
4,076,640.—PREPARATION OF SPHEROIDIZED PARTICLES. FEB. 28, 1978. SPN. 445496.
4,129,136.—REJUVENATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. DEC. 12, 1978.

Class 5N 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260, FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLING SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,893,933.—PROCESS FOR PRODUCING ENCAPSULATED TONER COMPOSITION. JULY 8, 1975.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,990,797.—DIFFRACTION MONITORING OF RAYLEIGH MODE JETS. NOV. 9, 1976.
4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.
4,097,404.—PROCESS FOR PROVIDING ENCAPSULATED TONER COMPOSITION-MICROENCAPSULATION. JUNE 27, 1978.

Class 5O

3,641,981.—APPARATUS FOR CONTROLLING DEVELOPER CHARGE LEVEL. FEB. 15, 1972. CAN. 0914006, GRB. 1338417.
3,654,901.—TONER RECLAIMING SYSTEM. APR. 11, 1972. ATR. 0321720, AUS. 0459286, BEL. 0754425, CAN. 0941881, DNK. 0130262, EGR. 0085711, FRA. 7029147, GRB. 1325455, IND. 0127847, ITL. 0901160, JAP. 1143014, NOR. 0130609, PLD. 0080951, PLP. 0008671, PTG. 0054272, SAF. 0705408, SPN. 0382437, STZ. 0513441, SWD. 0361533, TIW. 0006725, USR. 0373974.
3,664,297.—CENTRIFUGAL DEVELOPMENT APPARATUS AND METHOD. MAY 23, 1972. GRB. 1315565, JAP. 0719144.
3,809,012.—DEVELOPER SEAL. MAY 7, 1974. CAN. 0984133.
3,872,826.—DEVELOPMENT SYSTEM SEAL. MAR. 25, 1975.
3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.
3,906,899.—DEVELOPER SEAL. SEPT. 23, 1975.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.
4,039,102.—DEVELOPER DOOR WITH USE COUNTER ON DOOR. AUG. 2, 1977.
4,041,902.—FILTER APPARATUS. AUG. 16, 1977.
4,058,086.—EMISSION CONTROLLER FOR DEVELOPMENT APPARATUS. NOV. 15, 1977.
4,088,481.—EXTENDED RANGE COLOR ELECTROPHOTOGRAPHIC METHOD BY SUPERIMPOSING A HALF-TONE IMAGE ON A LOW. MAY 9, 1978.
4,100,611.—APPARATUS FOR CONTROLLING AIRBORNE PARTICLE EMISSION. JULY 11, 1978.
4,139,296.—CROSS MIXER. FEB. 13, 1979.

Class 5P

3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 6

3,753,560.—AUXILIARY SHEET FEEDER-MULTI STATION AUXILIARY PAPER FEEDER-2400. AUG. 21, 1973. AUS. 0466179, BEL. 0793641, CAN. 1000750, FRA. 7300150, GRB. 1402971, ITL. 0973328, SPN. 0410322.
3,833,790.—HEATED PRESSURE FUSING SYSTEM. SEPT. 3, 1974, FRA. 7422884.
4,111,565.—APPARATUS FOR SENSING WHEN PAPER UTILIZED IN A PRINTER HAS BEEN DEPLETED. SEPT. 5, 1978.
4,161,362.—DOCUMENT CODING. JULY 17, 1979.

Class 6A

3,104,873.—PAPER SUPPLY TRAY. SEPT. 24, 1963. CAN. 0699129, GRB. 1016553.
3,153,534.—PAPER SUPPLY TRAY. OCT. 20, 1964.
3,154,356.—PAPER CATCH TRAY. OCT. 27, 1964. CAN. 0726574, GRB. 1032952, JAP. 0497185.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,406,964.—ADJUSTABLE PACK HOLDER. OCT. 22, 1968. CAN. 0848822, GER. 1270049, GRB. 1158671, JAP. 0914623.
3,415,510.—AUXILIARY SHEET FEEDER. DEC. 10, 1968. CAN. 0831412, GRB. 1235158.

3,458,187.—SHEET HOLDER. JULY 29, 1969. CAN. 0879560, GRB. 1199947.
3,599,966.—SHEET HANDLING APPARATUS. AUG. 17, 1971. CAN. 0921504, JAP. 783765.
3,601,394.—SHEET RETAINING APPARATUS. AUG. 24, 1971. ARG. 0195162, AUS. 0437722, BEL. 0752940, CAN. 0966521, CHL. 0026165, CZC. 0164276, EGR. 0085710, FRA. 7024668, GRB. 1312304, ITL. 0900198, JAP. 0803409, MEX. 0116509, PLD. 0082760, PNM. 0002170, SPN. 0381385, STZ. 0547747, SWD. 0361648, TIW. 0005745, USR. 0493985.
3,651,933.—COPY SHEET PACKAGE. MAR. 28, 1972.
3,687,448.—SHEET FEEDING APPARATUS. AUG. 29, 1972. CAN. 9782161, GRB. 1373810.
3,847,385.—SHEET CONTAINER. NOV. 12, 1974. CAN. 0991208.
3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,848,988.—MOISTURE CONTROL DEVICE. NOV. 19, 1974.
3,857,558.—PAPER CASSETTE DESIGN WITH IRREGULAR BOTTOM. DEC. 31, 1974, CAN. 1010083.
3,883,133.—MOVABLE PACK ADVANCER. MAY 13, 1975.
3,907,283.—SENSING SHEETS ON A SUPPORT SURFACE. SEPT. 23, 1975.
3,921,972.—SHEET STACK RECEPTACLE. NOV. 25, 1975.
3,926,519.—CONTROL DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,934,870.—SHEET FEEDING DEVICES. JAN. 27, 1976.
3,936,044.—ADJUSTABLE SHEET GUIDE. FEB. 3, 1976.
3,957,366.—SHEET FEEDING APPARATUS. MAY 18, 1976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,008,957.—REPRODUCTION MACHINE CONTROL. FEB. 22, 1977.
4,014,537.—AIR FLOATATION BOTTOM FEEDER. MAR. 29, 1977.
4,060,233.—CASSETTE LOADED SHEET FEEDER FOR REPRODUCTION MACHINE. NOV. 29, 1977.
4,060,234.—CARTRIDGE TRAY FOR USE IN A COPYING MACHINE. NOV. 29, 1977.
4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.
4,086,007.—DUAL PURPOSE DOCUMENT AND COPY SHEET FEED CASSETTE. APR. 25, 1978.

Class 6A 1

3,100,111.—SHEET FEED MECHANISM. AUG. 6, 1963. ARG. 0162642, CAN. 0683564, GRB. 1032956, IND. 0096309, JAP. 0478677.
3,301,551.—SHEET FEED MECHANISM. JAN. 31, 1967. CAN. 0811029, JAP. 0639312.
3,378,254.—PACK ADVANCER. APR. 16, 1968. CAN. 0815409, GER. 1289850, GRB. 1129872, JAP. 0615872.
3,402,928.—SHEET HANDLING APPARATUS. SEPT. 24, 1968. CAN. 0871575, GRB. 1203615, JAP. 0602168.
3,558,127.—SHEET HANDLING APPARATUS. JAN. 26, 1971. ARG. 0180315, AUS. 0443480, BEL. 0741889, CAN. 0928826, FRA. 6939710, GRB. 1282910, ITL. 0878226, JAP. 0791733, MEX. 0112773, SPN. 0373541, SWD. 6915742.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,768,806.—BI-DIRECTIONALLY MOVABLE PLATFORM CONTROL. OCT. 30, 1973. CAN. 0992113, GRB. 1403040.
3,820,777.—ELEVATOR ASSEMBLY POSITIONING CONTROL. JUNE 28, 1974. BEL. 0802196, CAN. 0999334, GRB. 1416470.
3,898,425.—FUSING APPARATUS. AUG. 5, 1975.
4,004,127.—IMPROVED ON LINE FUSING SYSTEM. JAN. 18, 1977.
4,033,578.—STACK ELEVATING APPARATUS. MAY 7, 1977.
4,147,342.—VIBRATING TAMPER. APR. 3, 1979.

Class 6B

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,958,989.—TRANSPARENCY SUPPORT MATERIAL FOR ELECTROPHOTOGRAPHIC PROCESS. MAY 25, 1976. BEL. 0815634, CAN. 1006012.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.
4,051,285.—TEARABLE EDGE STRIP FOR PLASTIC SHEET. SEPT. 27, 1977. BEL. 815634, CAN. 1006012, FRA. 7419536, ITL. 1014700.

Class 6B 1

3,062,533.—PAPER FEED APPARATUS. NOV. 6, 1962. CAN. 0712936.
3,062,534.—SHEET FEED MECHANISM. NOV. 6, 1962. GRB. 1016700.
3,083,962.—SHEET STRIPPER. APR. 2, 1963. ARG. 0165468, CAN. 0712935, GRB. 1032958, IND. 0096311, JAP. 0484728.
3,104,872.—EDGE DRAG DEVICE. SEPT. 24, 1963. CAN. 0699594.
3,241,830.—SHEET FEED MECHANISM. MAR. 22, 1966. ATR. 0276287, AUS. 0295720, CAN. 0765301, DNK. 0126493, EIR. 0028650, GER. 1197326, GRB. 1089538, ISR. 0030228, NZL. 0148732, STZ. 0457511.
3,251,594.—SHEET FEED MECHANISM. MAY 17, 1966. AUS. 0416589, CAN. 0785164, DNK. 131.557, EIR. 0029758, GRB. 1122623, ISR. 0034134, JAP. 0499006, NOR. 0125806, SWD. 0358480.
3,276,770.—SHEET FEEDING APPARATUS. OCT. 4, 1966. CAN. 0788346, FRA. 1459041, GER. 1237587, GRB. 1055215, ITL. 0726800, JAP. 0537118.
3,288,460.—PAPER FEED MECHANISM. NOV. 29, 1966. ATR. 0300566, CAN. 0792617, GRB. 1135746, JAP. 0630911, STZ. 0509924.
3,288,461.—SHEET FEEDING APPARATUS. NOV. 29, 1966. CAN. 0856098, GER. 1249887, GRB. 1123260, JAP. 0562385.
3,300,206.—ELECTRICALLY ENERGIZED CLUTCH FOR SHEET FEED CONTROL MECHANISM. JAN. 24, 1967. CAN. 0788344, GRB. 1135745, MEX. 0112221, STZ. 0513063.
3,406,960.—PAPER HANDLING APPARATUS. OCT. 22, 1968. CAN. 0907683, GRB. 1202218.
3,425,685.—PAPER FEED MECHANISM. FEB. 4, 1969. BEL. 0708498, CAN. 0847744, FRA. 1552327, GRB. 1165279, ITL. 0819625, JAP. 0972609, MEX. 0105134.
3,469,834.—SHEET FEEDER AND SEPARATOR APPARATUS. SEPT. 30, 1969. ARG. 0168907, CAN. 0847743, CHL. 0023614, CLB. 0017683, JAM. 0001852, MEX. 0102646, PRU. 0009339, URG. 0008981, VZL. 0023673.
3,524,639.—AUTOMATIC FEEDING DEVICE. AUG. 18, 1970. CAN. 0895184, FRA. 6906418, GRB. 1254784, ITL. 0875431, JAP. 0713806.
3,537,703.—MANIFOLD SHEET SEPARATING DEVICE. NOV. 3, 1970. CAN. 0923351, GRB. 1261077.
3,556,516.—SELF-ALIGNING FEED ROLLER. JAN. 19, 1971. CAN. 0899392, GRB. 1256265.
3,565,421.—FEEDING SYSTEM. FEB. 23, 1971.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,578,317.—SHEET CONVEYOR APPARATUS FOR AUTOMATIC COPYING MACHINE. MAY 11, 1971. ARG. 0193800, ATR. 0307233, AUS. 0446229, BEL. 0750390, CAN. 0907682, EGR. 0082423, FRA. 7017317, GRB. 1284832, ITL. 0893096, JAP. 783766, MEX. 0117916, NZL. 0160102, SPN. 0379652, STZ. 0516404, SWD. 0361952, TIW. 0006833, VZL. 0025781.
3,580,565.—SHEET FEEDING APPARATUS. MAY 25, 1971.
3,592,462.—GATED PAPER SNUBBER. JULY 13, 1971. CAN. 0923922.
3,601,389.—SHEET FEEDING APPARATUS. AUG. 24, 1971. ARG. 0184657, BEL. 0752939, CAN. 0912055, CHL. 0026164, FRA. 7024666, GRB. 1306595, GUA. 0002508, ITL. 0907152, MEX. 0114977, PNM. 0002212, TIW. 0006720, VZL. 0032784.
3,618,752.—STACK OF IMAGE RECEIVING MEMBERS. NOV. 9, 1971.
3,655,183.—SHEET FEED APPARATUS. APR. 11, 1972.
3,664,663.—PAPER CASSETTE LOADING DEVICE. MAY 23, 1972. CAN. 0951342, GRB. 1351766.
3,713,645.—SHEET SEPARATING APPARATUS. JAN. 30, 1973. CAN. 0957392.
3,727,910.—SHEET SEPARATOR APPARATUS. APR. 17, 1973. CAN. 0956660, GRB. 1391198.
3,731,915.—FEED ROLL ABRASION ROLLER. MAY 8, 1973. ARG. 0194272, BEL. 0791064, CAN. 0966518, FRA. 7239549, GRB. 1389426, ITL. 0970223.
3,768,803.—SHEET FEEDER. OCT. 30, 1973. ARG. 0197314, BEL. 0795206, CAN. 0966158, FRA. 7304740, GRB. 1413541, ITL. 0978938, MEX. 0130347, SPN. 0411475, STZ. 5656860, SWD. 7301809, VZL. 0033780.
3,773,316.—SHEET FEEDER DRIVE MECHANISM. NOV. 20, 1973. CAN. 0994376, GRB. 1424580.
3,861,670.—SHEET FEEDING APPARATUS. JAN. 21, 1975. CAN. 1010080, GRB. 1435762.

3,866,901.—REVERSE BUCKLE FEEDER. FEB. 18, 1975, CAN. 1008893.
3,873,084.—PAPER FEEDER. MAR. 25, 1975.
3,893,663.—REVERSE BUCKLE SHEET FEEDING APPARATUS. JULY 8, 1975, CAN. 1005090, GRB. 1447909, MEX. 0135280.
3,895,791.—BOTTOM SHEET FEEDER USING SEPARATION BELT AND RETARD PAD. JULY 22, 1975, CAN. 1007255, GRB. 1443089.
3,934,869.—SHEET SEPARATING AND FEEDING APPARATUS. JAN. 27, 1976. GER. 7439833.
3,936,046.—FRONT AND SIDE SHEET REGISTERING APPARATUS. FEB. 3, 1976.
3,941,373.—FLOATING GATE SHEET SEPARATOR. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,966,189.—TOGGLING RETARD PAD. JUNE 29, 1976.
3,995,952.—SHEET FEEDING APPARATUS. DEC. 7, 1976.
4,023,792.—SHEET FEEDING APPARATUS. MAY 17, 1977. ARG. 0195877, AUS. 0462397, BEL. 0792370, CAN. 0978556, FRA. 7239132, GRB. 1410799, ITL. 0990513, MEX. 0128127, SPN. 0437744, STZ. 0546689.
4,030,725.—PAPER TRAY FOR COPYING MACHINES. JUNE 21, 1977.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.
4,053,152.—SHEET FEEDING DEVICE. OCT. 11, 1977.
4,058,305.—PAPER FEEDING DEVICE. NOV. 15, 1977.

Class 6B 2

3,378,255.—PAPER HANDLING APPARATUS. APR. 16, 1968. CAN. 0836939, FRA. 1527333, GRB. 1181271, ITL. 0804517, JAP. 1052342, MEX. 0099951.
3,547,431.—PNEUMATIC CUT SHEET FEEDER. DEC. 15, 1970.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.

Class 6C

3,120,446.—METHOD OF TRANSFERRING A DEVELOPED SOLID PARTICULATE IMAGE. FEB. 4, 1964.
3,519,124.—ARTICLE TO FACILITATE FEEDING OF IMAGE RECEIVING SHEETS. JULY 7, 1970. CAN. 0941879, FRA. 1568821, GRB. 1216347, ITL. 0870563.
3,589,809.—FEEDING SYSTEM. JUNE 29, 1971.
3,630,514.—SHEET FEEDING APPARATUS. DEC. 28, 1971. ARG. 0186214, AUS. 0452075, BEL. 0751309, CAN. 0921948, EGR. 0090063, FRA. 7019460, GRB. 1253503, ITL. 0893690, JAP. 783764, MEX. 0117507, SPN. 0380270, STZ. 0511759, SWD. 0363621, TIW. 0006836, USR. 0466680.
3,645,615.—COPYING APPARATUS. FEB. 29, 1972. ARG. 0185529, AUS. 0445849, BEL. 0752941, CAN. 0925927, CHL. 0025888, FRA. 7024670, GRB. 1312305, GUA. 0002324, ITL. 0900200, MEX. 0115165, PNM. 0002260, SPN. 0381387, STZ. 0525778, SWD. 7009063, TIW. 0007163, USR. 0535033, VZL. 0032783.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.

Class 6D

3,062,538.—SHEET FEEDING APPARATUS. NOV. 6, 1962. CAN. 0701742.
3,071,370.—SHEET FEEDING APPARATUS. JAN. 1, 1963. CAN. 0683900, GRB. 0999435.
3,071,374.—PAPER GRIPPER MECHANISM. JAN. 1, 1963.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,095,194.—SHEET GUIDING APPARATUS. JUNE 25, 1963. CAN. 0713451, FRA. 1355072, GER. 1174334, GRB. 1026214, ITL. 0688494, JAP. 0457839.
3,100,109.—PAPER GRIPPER MECHANISM. AUG. 6, 1963. GRB. 1015634, JAP. 0471314.
3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,137,495.—SHEET FEED MECHANISM. JUNE 16, 1964. GRB. 1015636, JAP. 0471315.
3,179,407.—SHEET FEED GUIDE. APR. 20, 1965. CAN. 0719606, FRA. 1355071, GER. 1179562, GRB. 1023036, ITL. 0688495, JAP. 0457850.
3,190,643.—SHEET GUIDING APPARATUS. JUNE 22, 1965.
3,199,866.—SHEET FEED MECHANISM. AUG. 10, 1965. CAN. 0742591, GRB. 1043646.
3,206,193.—XEROGRAPHIC REPRODUCING MACHINE CONTROL. SEPT. 14, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,245,311.—DOCUMENT CONVEYOR. APR. 12, 1966.
3,256,009.—SHEET REGISTRATION DEVICE. JUNE 14, 1966. CAN. 0777667.
3,281,144.—SHEET REGISTRATION DEVICE. OCT. 25, 1966. ARG. 0152212, AUS. 0423243, CAN. 0803888, DNK. 0122597, EIR. 0029757, GRB. 1122621, ISR. 0034133, JAP. 0512650, MEX. 0078899, NOR. 0126565, SWD. 0358034.
3,357,347.—PAPER FEEDING AND BREAKING MEANS FOR ELECTROGRAPHIC DEVICE. DEC. 12, 1967. CAN. 0863520, GRB. 1182684, JAP. 0582500.
3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,389,907.—DOCUMENT HANDLING APPARATUS. JUNE 25, 1968.
3,411,771.—SHEET TRANSPORT. NOV. 19, 1968. ARG. 0177552, ATR. 0284168, AUS. 0455833, CAN. 0869421, CHL. 0023101, CLB. 0016775, DNK. 0126100, EIR. 0031308, FIN. 0047867, GRB. 1193515, IND. 0112002, ISR. 0028520, JAP. 0604153, MEX. 0099909, NOR. 0127531, NZL. 0149790, PAK. 0119259, PLP. 0005199, PRU. 0009331, SAF. 0674988, SPN. 0344351, STZ. 0478048, SWD. 0343829, TRK. 0015345, URG. 0008858, VZL. 0026277.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,434,710.—SHEET HANDLING APPARATUS. MAR. 25, 1969. ARG. 0166613, CAN. 0830328, CHL. 0023568, CLB. 0017530, DNK. 0120163, GRB. 1206965, MEX. 0100814, PRU. 0009338, SPN. 0360895, STZ. 0502942. URG. 0008977, USR. 0433696, VZL. 0023674.
3,502,325.—CARD HANDLING APPARATUS. MAR. 24, 1970. ARG. 0168398, CAN. 0850515, CHL. 0024133, JAM. 0001890, MEX. 0105082, PRU. 0009337, URG. 0009016, VZL. 0027509.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,517,923.—SHEET REGISTRATION APPARATUS. JUNE 30, 1970.
3,518,739.—TRACKING ROLLER. JULY 7, 1970. ARG. 0177437, AUS. 0437287, BEL. 0733662, BRA. 6908481, CAN. 0884215, FRA. 6917189, GRB. 1206750, ITL. 0865847, JAP. 0677424, MEX. 0111433, SPN. 0367807, SWD. 0356022, VZL. 0025065.
3,521,060.—METHOD FOR DETECTING MISROUTING OF TRANSPARENCIES DURING PROCESS OF IMAGING THEREON. JULY 21, 1970.
3,531,109.—SHEET MATERIAL TRANSPORT SYSTEM. SEPT. 29, 1970. ARG. 0177190, ATR. 0288161, AUS. 0446394, BEL. 0733197, CAN. 0899923, DNK. 0122717, FRA. 6916409, GER. 1925039, GRB. 1269100, ITL. 0863848, JAP. 0656986, MEX. 0110288, PNM. 0001431, SAF. 0693497, SPN. 0367408, SWD. 0355870.
3,536,320.—SHEET REGISTRATION DEVICE. OCT. 27, 1970.
3,556,511.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. ARG. 0185791, BEL. 0741891, CAN. 0905439, FRA. 6939711, GER. 1957780, GRB. 1279129, HOL. 0144227, ITL. 0878272, JAP. 0854601, MEX. 0112825.
3,556,512.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905438, SWD. 6915838.
3,556,513.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905437.
3,601,392.—SHEET REGISTERING APPARATUS. AUG. 24, 1971. ARG. 0190238, AUS. 0446147, BEL. 0752933, CAN. 0923512, CHL. 0025789, EGR. 0084327, FRA. 7024672, GRB. 1262444, ITL. 0900199, JAP. 0803410, MEX. 0115310, PLD. 0002183, PNM. 0002050, SPN. 0381386, STZ. 0525780, SWD. 0356375, TIW. 0007194, USR. 0406343.
3,603,680.—ULTRASONIC PAPER DETACTION. SEPT. 7, 1971. CAN. 0915715, GRB. 1331457.
3,614,221.—IMAGING SYSTEM. OCT. 19, 1971. CAN. 0930540, GRB. 1343603, JAP. 0728865.
3,622,238.—COPIER MACHINE FEEDING MULTIPLE SIZE COPY SHEETS. NOV. 23, 1971. ARG. 0194337, AUS. 0451241, CAN. 0902127, JAP. 0512383, NZL. 0160105.
3,647,207.—SHEET FEEDING MECHANISM CENTERING DEVICE. MAR. 7, 1972. CAN. 0959934, GRB. 1351765.
3,694,712.—SPEED CONTROL APPARATUS. SEPT. 26, 1972. CAN. 0976641, GRB. 1339506.
3,796,486.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. MAR. 12, 1974.

3,804,516.—FIRE DETECTING DEVICE FOR A PHOTOGRAPHIC PRINTING MACHINE. APR. 16, 1974.
3,809,475.—COPIER FUSER PROTECTOR. MAY 7, 1974. FRA. 7343567.
3,815,380.—SHAFT COUPLING APPARATUS. JUNE 11, 1974, CAN. 0994121.
3,819,266.—COPIER JAM PROTECTION. JUNE 25, 1974, CAN. 1005510.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974, CAN. 0999316.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975, CAN. 1004240.
3,876,317.—LATCH MECHANISM. APR. 8, 1975, CAN. 1005486.
3,888,579.—DIGITAL CONTROLLED DOCUMENT FEEDER. JUNE 10, 1975.
3,893,662.—SHEET FEEDING DEVICE. JULY 8, 1975.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.
3,934,182.—SYNCHRONIZING APPARATUS. JAN. 20, 1976. CAN. 0957735, GRB. 1372568.
3,936,042.—SHEET FEEDING DEVICES. FEB. 3, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
3,948,511.—SHEET FEEDING DEVICES. APR. 6, 1976.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976
3,963,339.—SHEET FEEDING APPARATUS. JUNE 15, 1976.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
4,003,568.—FLUID CONVEYER. JAN. 18, 1977.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.
4,036,421.—WEIGHTED PINCH ROLLS. JULY 19, 1977.
4,055,340.—ASSISTED PNEUMATIC TRANSPORT AND REGISTRATION APPARATUS. OCT. 25, 1977. BEL. 848823.
4,073,001.—APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET. FEB. 7, 1978.
4,077,519.—CURL DETECTOR AND SEPARATOR. MAR. 7, 1978.
4,090,704.—REGISTRATION STATION. MAY 23, 1978.
4,092,021.—UNFUSED IMAGE TRANSPORT. MAY 30, 1978.
4,128,327.—TRANSFER MATERIAL FEED APPARATUS FOR ELECTROPHOTOGRAPHIC COPYING MACHINES. DEC. 5, 1978.
4,134,671.—INTERSECTING OPTICAL AND COPY SHEET PATH METHOD AND APPARATUS. JAN. 16, 1979.
4,135,804.—REGISTRATION SYSTEM FOR A REPRODUCING MACHINE. JAN. 23, 1979.

Class 6D 1

RE.29,124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,148,878.—SHEET FEED MECHANISM. SEPT. 15, 1964. CAN. 0715431, GER. 1222083, GRB. 1020933, JAP. 0481251.
3,240,486.—PAPER TRANSPORT MECHANISM. MAR. 15, 1966. CAN. 0766647.
3,275,318.—SHEET CONVEYING APPARATUS. SEPT. 27, 1966. MEX. 0085657.
3,408,633.—HIGH SPEED PRINTER SYSTEM. OCT. 29, 1968.
3,482,676.—DOCUMENT FEED BELT. DEC. 9, 1969. CAN. 0890297, GRB. 1253415.
3,642,362.—APPARATUS FOR CONVEYING SHEET MATERIAL. FEB. 15, 1972. GRB. 1307117.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,743,403.—TRANSPORT ASSEMBLY. JULY 3, 1973. CAN. 0983305, GRB. 1417018.
3,781,004.—CONVEYING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. DEC. 25, 1973. CAN. 1007287.
3,790,270.—REGISTRATION RESET SYSTEM. FEB. 5, 1974. GRB. 1439772, ITL. 0993064, SPN. 0418253.
3,804,507.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. APR. 16, 1974.
3,808,658.—SNAP ROLLER. MAY 7, 1974, CAN. 1000637.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974, CAN. 1001104.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,854,566.—PHOTOELECTRIC TABULATING APPARATUS. DEC. 17, 1974. BEL. 0815420, CAN. 0982969, GRB. 1442450, ITL. 1012805, SWD. 7406400.
3,902,715.—SHEET REGISTRATION FOR PAPER HANDLING APPARATUS. SEPT. 2, 1975, CAN. 1003867, ITL. 0993066, SPN. 0418255.
3,918,705.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. NOV. 11, 1975.
3,930,725.—MULTIPLE SHEET FEEDING SYSTEM FOR ELECTROSTATOGRAPHIC PRINTING MACHINES. JAN. 6, 1976. GRB. 1436457.
4,085,673.—SHEET FEEDING APPARATUS. APR. 25, 1978.

Class 6D 2

3,112,819.—CLUTCH MECHANISM—914. DEC. 3, 1963. CAN. 0688810.
3,337,015.—LATCH OPERATED AND ONE WAY COIL CLUTCHES. AUG. 22, 1967. CAN. 0810494, JAP. 0914622.
3,840,100.—UNIDIRECTIONAL COUPLING APPARATUS. OCT. 8, 1974. CAN. 1006706.

Class 6E

RE29124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,348,288.—DRUM CLAMP. OCT. 24, 1967. CAN. 0838542, GRB. 1123459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,567,213.—CONTROL APPARATUS FOR REGISTER STOPS AND GRIPPER FINGERS. MAR. 2, 1971.
3,685,898.—PAPER FLIP CONTROL APPARATUS. AUG. 22, 1972.
3,717,801.—METHODS AND APPARATUS FOR ELCLRSTCLY PRFMNG A TCKING OPERATION. FEB. 20, 1973.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,841,751.—ELECTROSTATIC COLOR REPRODUCTION METHOD. OCT. 15, 1974. CAN. 0946463.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974. CAN. 0999316.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,063,946.—ELECTROPHOTOGRAPHIC COLOR REPRODUCTION PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIAL WITH DUAL. DEC. 20, 1977.
4,078,862.—APPARATUS FOR PRODUCING A COMPOSITE COPY OF AN ORIGINAL DOCUMENT ON SELECTIVELY POSITIONED. MAR. 14, 1978.
4,082,137.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING AN ELECTROSTATOGRAPHIC MACHINE. APR. 4, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,085,794.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. APR. 25, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,138,102.—AUTOMATIC DOCUMENT PROCESSING DEVICE. FEB. 6, 1979.

Class 6F

3,249,354.—MULTIPLE SHEET DETECTING DEVICE. MAY 3, 1966. CAN. 0770494.
3,281,145.—PAPER REJECT MECHANISM. OCT. 25, 1966. CAN. 0770493.
3,288,462.—APPARATUS FOR HANDLING SUPERPOSED SHEETS. NOV. 29, 1966. AUS. 0422882, CAN. 0786210, EIR. 0029759, GRB. 1122625, ISR. 0034135, JAP. 0894757, NOR. 0124531.
3,301,975.—SENSING DEVICE FOR DETECTING A SHEET ON A TRANSPORT OR DRUM. JAN. 31, 1967. CAN. 0800094, FRA. 1487581, GER. 1522699, GRB. 1077117, ITL. 0774188, JAP. 0923304.

3,360,652.—FAIL SAFE PHOTOELECTRIC SHEET SENSING MACHINE CONTROL CIRCUIT. DEC. 26, 1967. CAN. 0775268, FRA. 1455478, GER. 1522805, GRB. 1121099, ITL. 0732531, JAP. 0503244, MEX. 0078869.

3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

3,504,911.—VACUUM POWERED MULTIPLE DOCUMENT DETECTOR. APR. 7, 1970. CAN. 0861362, FRA. 1589986, GER. 1804476, GRB. 1241968, ITL. 0845395, JAP. 0656984.

3,593,065.—SHEET DETECTION APPARATUS. JULY 13, 1971. CAN. 0923544, CZC. 0151559, EGR. 0100567, GRB. 1322794, JAP. 1162030, USR. 0365085.

3,614,419.—MULTIPLE SHEET DETECTION SYSTEM. OCT. 19, 1971. ARG. 0186441, BEL. 0765366, CAN. 0930052, FRA. 7113404, GRB. 1342656, ITL. 0922694, MEX. 0119754, VZL. 0021933.

3,627,311.—SHEET SENSOR. DEC. 14, 1971. CAN. 0871371, GRB. 1322258.

3,628,785.—GRIP FORCE DETECTION APPARATUS. DEC. 21, 1971. ARG. 0185946, AUS. 0455882, BEL. 0760750, CAN. 0923158, FRA. 7047695, GRB. 1340206, ITL. 0913997, MEX. 0117505, STZ. 0518227, SWD. 7017384, VZL. 0032788.

3,650,616.—MISPUFF DETECTOR. MAR. 21, 1972. BEL. 0778739, CAN. 0954181, FRA. 7203548, GRB. 1374923, ITL. 0947120.

3,650,617.—SWITCHING DETECTOR—A. MAR. 21, 1972.

3,650,618.—SWITCHING DETECTOR—B. MAR. 21, 1972.

3,650,619.—SWITCHING DETECTOR—C. MAR. 21, 1972.

3,684,890.—PHOTOSENSITIVE MISFEED DETECTOR. AUG. 15, 1972. CAN. 0929631, GRB. 1335444.

3,778,051.—SUPERPOSED SHEET DETECTOR. DEC. 11, 1973. CAN. 0975067.

3,791,729.—APPARATUS FOR MONITORING A SHEET TRANSPORT MECHANISM. FEB. 12, 1974. CAN. 0991244, GRB. 1413069.

3,882,308.—DETECTION SYSTEM FOR SUPERPOSED SHEETS. MAY 6, 1975. CAN. 0929632, GRB. 1342838.

3,932,755.—DEVICE FOR DETECTING DOUBLE SHEET FEEDING. JAN. 13, 1976.

3,948,508.—SHEET DETECTING APPARATUS. APR. 6, 1976.

4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.

4,077,519.—CURL DETECTOR AND SEPARATOR. MAR. 7, 1978.

Class 6G

3,152,757.—XEROGRAPHIC CONTROL APPARATUS. OCT. 13, 1964. JAP. 0494168.

3,260,455.—STEPPED COUNTING APPARATUS. JULY 12, 1966. ARG. 0157223, BRA. 0083779, CAN. 0760825, FRA. 1459930, GER. 1513422, GRB. 1113420, ITL. 0729650, MEX. 0094217.

3,301,126.—REPRODUCING APPARATUS. JAN. 31, 1967. CAN. 0777413, EIR. 0029760, GRB. 1122626, ISR. 0034136, JAP. 0669365, NOR. 0128732.

3,358,570.—COPY COUNTING SYSTEM. DEC. 19, 1967. CAN. 0842444, FRA. 1508192, GER. 1283855, GRB. 1165943, ITL. 0787991, JAP. 0572187.

3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.

3,375,783.—COPY INDICATING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.

3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590, ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.

3,655,281.—BILLING APPARATUS. APR. 11, 1972. BEL. 0760911, CAN. 0929013, FRA. 7047633, GRB. 1329579, ITL. 0913956, JAP. 0766713.

3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974. GPB. 1457781, ITL. 1009725, SPN. 0425049.

3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.

3,909,128.—CONTROL LOGIC FOR CHARGING A MULTI-MODE COPIER DUPLICATOR FROM ONE MODE TO ANOTHER. SEPT. 30, 1975. BEL. 0819383.

3,916,171.—COUNTING CIRCUIT. OCT. 28, 1975.

3,989,368.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER DUPLICATOR. NOV. 2, 1976. BEL. 0819384.

4,019,028.—PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM. APR. 19, 1977. BEL. 0812560, GRB. 1451992, ITL. 1010688, SPN. 0424462.

4,057,341.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 8, 1977. AUS. 489874, BEL. 819384, CAN. 1029431, GRB. 1470598, MEX. 137406.

4,058,815.—METERING SYSTEM FOR A COPIER/DUPLICATOR MACHINE. NOV. 15, 1977. BEL. 824682, FRA. 7501637, GRB. 1451991.

Class 6H

3,062,536.—SHEET STRIPPING APPARATUS. NOV. 6, 1962. ARG. 0174781, CAN. 0736834, PNM. 0001999, VZL. 0023703.

3,090,616.—SHEET HANDLING CONTROL APPARATUS. MAY 21, 1963. CAN. 0683777.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,400.—ELECTROSTATIC APPARATUS FOR PAPER DETACKING. DEC. 12, 1967. CAN. 0841229, MEX. 0100315.

3,450,402.—SHEET STRIPPER APPARATUS. JUNE 17, 1969.

3,506,259.—ELECTROSTATIC SHEET DETACKING APPARATUS. APR. 14, 1970. ARG. 0177881, AUS. 0418161, BEL. 0721966, CAN. 0848612, FRA. 1585343, GRB. 1230113, ITL. 0895052, MEX. 0104231.

3,578,859.—MECHANICAL STRIPPING APPARATUS. MAY 18, 1971. ARG. 0185526, AUS. 0445289, BEL. 0752938, CAN. 0922771, CHL. 0025913, EGR. 0085002, FRA. 7024669, GRB. 1296763, GUA. 0002611, ITL. 0900197, MEX. 0117139, PLD. 0081340, PNM. 0002049, SPN. 0381384, STZ. 0523150, SWD. 0366849, TIW. 0007785, USR. 0443525, VZL. 0032781.

3,620,615.—SHEET STRIPPING APPARATUS. NOV. 16, 1971. CAN. 0927472, GRB. 1290518.

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972.

3,774,907.—VACUUM SHEET STRIPPING APPARATUS. NOV. 27, 1973. CAN. 0966519.

3,804,401.—PNEUMATIC STRIPPING APPARATUS. APR. 16, 1974. CAN. 0998705.

3,811,670.—ELECTROSTATOGRAPHIC APPARATUS WITH AIR BAFFLE. MAY 21, 1974.

3,819,175.—VACUUM STRIPPING ROLL WITH STATIONARY PICKUP SLOTS. JUNE 25, 1974.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.

3,837,640.—STRIPPER FINGER WITH AIR CUSHION. SEPT. 24, 1974. CAN. 1002077, FRA. 7338663, GRB. 1427058, ITL. 998964.

3,857,560.—ADHESIVE PAPER PICK-OFF SYSTEM. DEC. 31, 1974.

3,885,785.—VACUUM TRANSPORT. MAY 27, 1975. CAN. 1008892, FRA. 7437717.

3,885,786.—STRIPPER FINGER. MAY 27, 1975. GRB. 1402956.

3,891,206.—SHEET STRIPPING APPARATUS. JUNE 24, 1975. CAN. 1003868, GRB. 1449754.

3,895,793.—VACUUM SHEET STRIPPER. JULY 22, 1975. CAN. 1014179.

3,907,280.—FLEXIBLE SHEET HANDING DEVICE. SEPT. 23, 1975. FRA. 7322885.

3,940,126.—SHEET HANDLING MECHANISM. FEB. 24, 1976. GRB. 1450219.

3,948,507.—COPYING STRIPPER. APR. 6, 1976.

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188, FRA. 7406478, GRB. 1451288, ITL. 1008269, SPN. 0423529, STZ. 5672880.

3,991,999.—REVOLVING STRIPPER FINGER. NOV. 16, 1976.

3,992,000.—SHEET STRIPPER. NOV. 16, 1976.

3,998,536.—METHOD & APPARATUS FOR ELECTROSTATIC PAPER STRIPPING. DEC. 21, 1976.

4,004,802.—SHEET STRIPPING DEVICE. JAN. 25, 1977.

4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.

4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.

4,026,541.—SHEET STRIPPING DEVICE. MAY 31, 1977.

4,058,306.—DETACK AND STRIPPING SYSTEM. NOV. 15, 1977.

4,060,235.—SELF-LIFTING VACUUM STRIPPER. NOV. 29, 1977.

4,072,307.—CORNER SHEET STRIPPER. FEB. 7, 1978.

4,073,585.—SHEET REMOVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 14, 1978.

4,092,021.—UNFUSED IMAGE TRANSPORT. MAY 30, 1978.
4,119,307.—SHEET STRIPPING APPARATUS. OCT. 10, 1978.
4,119,308.—SHEET STRIPPING APPARATUS. OCT. 10, 1978.

Class 6I

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3,416,861-D1593. AUG. 7, 1973.
3,075,493.—XEROGRAPHIC APPARATUS WITH WEB CUTTING MEANS. JAN. 29, 1963. CAN. 0682231, FRA. 1280975, GER. 1177487, GRB. 0979161, JAP. 0502929.
3,105,425.—WEB MARKING AND CUTTING APPARATUS FOR XEROGRAPHIC REPRODUCING DEVICES. OCT. 1, 1963. CAN. 0701949.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,244,084.—WEB MARKING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 5, 1966.
3,401,613.—WEB CUTTER CONTROL DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 17, 1968. CAN. 0786141, GRB. 1118217, JAP. 0517506.
3,402,628.—CUTTING APPARATUS. SEPT. 24, 1968. CAN. 0847666, GRB. 1137800.
3,416,061.—SIGNAL STORAGE DEVICE—REISSUED D72104—27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,466,959.—WEB MATERIAL HANDLING APPARATUS. SEPT. 16, 1969.
3,485,622.—PRINTING OF TIMING MARKS IN XEROGRAPHIC PROCESS. DEC. 23, 1969. FRA. 1488142, GER. 1522700, GRB. 1047451, JAP. 0608701.
3,504,586.—ROLL CONVERTER CONTROL. APR. 7, 1970.
3,506,175.—ROLL STOCK CONVERTING APPARATUS. APR. 14, 1970.
3,585,289.—FACSIMILE RECORDING APPARATUS WITH CAM OPERATED PAPER CUTTER. JUNE 15, 1971.
3,591,279.—CUT AND DEFLECT WEB DRIVE APPARATUS. JULY 6, 1971. CAN. 0924635, FRA. 7019910, GRB. 1307549, ITL. 0893691.
3,639,053.—WEB CUTTING AND FEEDING APPARATUS. FEB. 1, 1972. ARG. 0192554, AUS. 0461657, BEL. 0749786, CAN. 0917974, FRA. 7015812, GRB. 1314727, ITL. 0900026, MEX. 0116866, SAF. 0703019, SPN. 0379248, STZ. 0516181, SWD. 7006081.
3,728,920.—CUT AND DEFLECT WEB DRIVE APPARATUS. APR. 24, 1973.
3,743,409.—CUTTER ASSEMBLY. JULY 3, 1973. BEL. 0784635, CAN. 0974447, FRA. 7220418, GRB. 1400465, ITL. 0956414.
3,855,890.—SLITTER/PERFORATOR APPARATUS. DEC. 24, 1974. BEL. 808873, CAN. 0996462, FRA. 7345296, GRB. 1423770, ITL. 1001152, USR. 0546267.
3,882,744.—ELECTROSTATOGRAPHIC WEB FEEDING APPARATUS. MAY 13, 1975. FRA. 7417339.
3,931,090.—RUBBER COMPOSITIONS FOR FLEXIBLE BELTS. JAN. 6, 1976.
4,043,233.—METHOD OF PREVENTING MULTI-SHEET FEEDING. AUG. 23, 1977.

Class 6J

3,380,733.—SHEET STRIPPING APPARATUS. APR. 30, 1968. ATR. 0268045, AUS. 0413138, BEL. 0689067, CAN. 0819593, DNK. 0112289, FRA. 1499560, GER. 1522704, GRB. 1157342, HOL. 0151191, ITL. 0788572, JAP. 0560087, LXB. 0052213, MEX. 0101989, NOR. 0122220, NZL. 0146848, PTG. 0046633, SAF. 0666572, SPN. 0332819, STZ. 0468661, SWD. 0326103, USR. 0261292.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,548,783.—PAPER TRANSPORT - SHEET TURNER PAPER TRANSPORT-90 DEG TURN. DEC. 22, 1970.
3,627,312.—RESTACKING APPARATUS. DEC. 14, 1971. AUS. 0447183, BEL. 0752942, CAN. 0922747, CHL. 0025830, EGR. 0084128, FRA. 7024663, GRB. 1312303, GUA. 0002616, ITL. 0900193, JAP. 791920, MEX. 0114980, PLD. 0081346, PNM. 0001953, SPN. 0381379, STZ. 0525779, SWD. 0359381, TIW. 0022313, VZL. 0032782.
3,856,295.—INVERTER-REVERSER FOR A REPRODUCTION MACHINE. DEC. 24, 1974.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,942,785.—SELF-ACTUATING SHEET INVERTER-REVERSER. MAR. 9, 1976.
3,944,212.—SHEET REVERSING MECHANISM. MAR. 16, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
4,040,616.—SHEET TURN AROUND INVERTER. AUG. 9, 1977. FRA. 7701111.

Class 6K

D.227,933.—SORTER. JULY 24, 1973.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.233,937.—SORTER. DEC. 17, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
3,395,913.—SHEET MATERIAL DISTRIBUTION SYSTEM. AUG. 6, 1968. AUS. 0409539, BEL. 0704922, CAN. 0832159, FRA. 1543565, GRB. 1193517, ITL. 0823413, JAP. 0645590, MEX. 0101165, USR. 0343419.
3,460,824.—MODULAR SHEET DISTRIBUTOR. AUG. 12, 1969. ARG. 0175858, ATR. 0304588, AUS. 0443802, CAN. 0871013, CHL. 0023362, CLB. 0016672, EIR. 0031307, FIN. 0047868, GRB. 1193514, IND. 0112001, ISR. 0028521, JAP. 0645589, MEX. 0099178, NOR. 0125174, NZL. 0149789, PAK. 0119258, PLP. 0006159, PRU. 0009362, SAF. 0674987, SPN. 0344350, STZ. 0478049, SWD. 0342203, TRK. 0014721, URG. 0008514, VZL. 0016672.
3,484,101.—SORTING APPARATUS FOR DOCUMENTS. DEC. 16, 1969. CAN. 0889441, GRB. 1246033.
3,552,739.—SHEET HANDLING APPARATUS. JAN. 5, 1971. BEL. 0738575, CAN. 0921945, FRA. 6930567, GRB. 1274277, ITL. 0871023.
3,565,420.—DOCUMENT FEEDING APPARATUS. FEB. 23, 1971. ARG. 0184075, AUS. 0453309, BEL. 0750391, CAN. 0922328, EGR. 0082941, FRA. 7017112, GRB. 1305825, ITL. 0893198, MEX. 0117914, PLD. 0082841, SPN. 0379694, STZ. 0513435, SWD. 0368797, USR. 0476767.
3,589,808.—REPRODUCING APPARATUS. JUNE 29, 1971. CAN. 0917482.
3,618,936.—JAM DETECTION SYSTEM FOR SORTING APPARATUS. NOV. 9, 1971. AUS. 0445492, BEL. 0758059, CAN. 0949671, EGR. 0088009, FRA. 7041622, GRB. 1324119, ITL. 0909902, PLD. 0081147, SPN. 0385034, STZ. 0525723, TIW. 0007648.
3,622,061.—STAPLE FEED AND FASTENING APPARATUS. NOV. 23, 1971.
3,630,607.—SET SEPARATION COPIER SYSTEM. DEC. 28, 1971.
3,649,006.—SHEET HANDLING APPARATUS. MAR. 14, 1972. BEL. 07o2643, CAN. 0944310, FRA. 7104922, GRB. 1341286, ITL. 0918344, JAP. 0795150.
3,652,875.—CONTROL CIRCUIT FOR DRIVING STAPLING MECHANISM. MAR. 28, 1972.
3,669,447.—SHEET PROPELLING APPARATUS. JUNE 13, 1972. CAN. 0938624.
3,671,094.—COVER APPARATUS. JUNE 20, 1972.
3,682,328.—TRAY APPARATUS. AUG. 8, 1972.
3,685,712.—STAPLING APPARATUS. AUG. 22, 1972. CAN. 0953851.
3,690,537.—STAPLE FORMING AND FASTENING APPARATUS. SEPT. 12, 1972.
3,695,756.—SHEET STRIPPING APPARATUS. OCT. 3, 1972. BEL. 0774563, CAN. 0950931, FRA. 7139637, GRB. 1366909, ITL. 0937673.
3,707,418.—METHOD OF BINDING. DEC. 26, 1972. CAN. 0974723, EGR. 0094346, GRB. 1359338.
3,709,485.—CONTROL CIRCUIT FOR SORTING SYSTEM. JAN. 9, 1973.
3,709,492.—SORTING APPARATUS. JAN. 9, 1973. ARG. 0194366, AUS. 0457968, BEL. 0783854, CAN. 0968300, FRA. 7218317, GRB. 1365399, ITL. 0955692, MEX. 0127721, SPN. 0403108, STZ. 0555198.
3,719,266.—SHEET STACKING APPARATUS. MAR. 6, 1973.
3,735,978.—METHOD AND APPARATUS FOR STACKING COPY SHEETS. MAY 29, 1973. ARG. 0190825, BEL. 0772406, CAN. 0951340, FRA. 7133309, GRB. 1358420, ITL. 0936377, MEX. 0125745.
3,788,640.—MOVING BIN SORTING APPARATUS. JAN. 29, 1974. CAN. 0996495, FRA. 7346312, GRB. 1429726.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,833,911.—REPRODUCTION SYSTEM AND METHOD WITH SIMPLEX AND DUPLEX MODES OF OPERATION. SEPT. 3, 1974.

3,841,754.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974.
3,841,827.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974. BEL. 0816155, FRA. 7419739, GER. 7409422, GRB. 1441370.
3,845,949.—SORTER CONTROL TO PREVENT OVER-STACKING IN THE SORTER TRAYS. NOV. 5, 1974. BEL. 808173, CAN. 1005511, FRA. 7342816, GRB. 1436599, ITL. 1002130, SPN. 0421148.
3,848,995.—COPIER/DUPLICATOR SYSTEM. NOV. 19, 1974. BEL. 0815548, GRB. 1450847, ITL. 1012907, SPN. 0426782.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,861,861.—FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,866,904.—MULTIPLE FEED SORTING APPARATUS. FEB. 18, 1975. CAN. 1001109, GRB. 1432790.
3,868,019.—TRAY APPARATUS. FEB. 25, 1975. FRA. 7346312, CAN. 0996495, FRA. 7346912, GRB. 1429726.
3,870,295.—SORTER SUPPLEMENT CONTROL. MAR. 11, 1975. CAN. 1007283.
3,871,643.—SORTER CONTROL. MAR. 18, 1975. BEL. 808172, CAN. 1000647, GRB. 1422029, ITL. 1002129, SPN. 0421116.
3,878,818.—CLEANING APPARATUS FOR DRY FUSER ROLLS. APR. 22, 1975. FRA. 7427783, GRB. 1464759.
3,880,119.—DEVELOPMENT APPARATUS. APR. 29, 1975.
3,902,709.—BINLESS SORTER. SEPT. 2, 1975. FRA. 7436985.
3,907,276.—WOBBLE JOGGER. SEPT. 23, 1975.
3,908,978.—BINLESS SORTING APPARATUS. SEPT. 30, 1975. CAN. 0996586, GRB. 1426020.
3,917,256.—DUAL PURPOSE SHEET HANDLING APPARATUS. NOV. 4, 1975. CAN. 1014098.
3,917,257.—SHEET INVERTER APPARATUS. NOV. 4, 1975. CAN. 1005009, FRA. 7346309, GRB. 1430620.
3,938,802.—SHEET STACKING APPARATUS. FEB. 17, 1976. CAN. 1010462, GRB. 1431605.
3,941,369.—SHEET DISTRIBUTING APPARATUS. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,953,023.—BIN INDICATOR DEVICE. APR. 27, 1976.
3,971,554.—SHEET STACKER. JULY 27, 1976.
3,973,769.—COMPACT SORTING APPARATUS. AUG. 10, 1976. BEL. 0836261.
3,977,667.—SORTING APPARATUS. AUG. 31, 1976.
3,988,817.—PRESSURE ROLL FOR FUSER APPARATUS. NOV. 2, 1976.
3,990,695.—SORTING APPARATUS. NOV. 9, 1976.
3,995,748.—SORTER APPARATUS. DEC. 7, 1976. BEL. 0844420.
4,011,952.—MANUAL SORTER. MAR. 15, 1977.
4,012,034.—MULTIPLE MODULAR SORTER ASSEMBLY. MAR. 15, 1977.
4,012,035.—SORTER CONTROL SYSTEM. MAR. 15, 1977.
4,015,841.—SORTER. APR. 5, 1977.
4,022,458.—SHEET DISTRIBUTION APPARATUS. MAY 10, 1977.
4,029,309.—SET TRANSPORT AND STACKER. JUNE 14, 1977. BEL. 0847844.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,037,832.—IMPROVED SORTER APPARATUS. JULY 26, 1977.
4,038,594.—DISTORTIONLESS LINE WAVE AMPLIFICATION. JULY 26, 1977.
4,049,180.—STITCHING HEAD BYPASS APPARATUS. SEPT. 20, 1977.
4,055,339.—SORTER APPARATUS. OCT. 25, 1977.
4,069,728.—SHEET SLITTING APPARATUS. JAN. 24, 1978.
4,084,809.—SHEET STACKING APPARATUS. APR. 18, 1978.
4,087,087.—SHEET STACKING APPARATUS FOR SORTER. MAY 2, 1978.
4,111,410.—SORTING APPARATUS AND REPRODUCING MACHINE. SEPT. 5, 1978.
4,138,076.—STAPLE CASSETTE. FEB. 6, 1979.
4,151,944.—STAPLERS. MAY 1, 1979.

Class 7

3,784,300.—PRE-TRANSFER STATION. JAN. 8, 1974. AUS. 0465154, BEL. 0789340, CAN. 1000782, EGR. 0106095, FRA. 7234200, GRB. 1379826, ITL. 0972691, MEX. 0128584, SPN. 0409975, STZ. 0557051, SWD. 7215168.
3,809,471.—PHOTOELECTROPHORETIC IMAGING APPARATUS WITH CORRECTION FOR PARALLAX. MAY 7, 1974.
3,819,263.—CLEANING APPARATUS. JUNE 25, 1974. ARG. 0200252, AUS. 0469469, BEL. 0796984, EGR. 0104374, FRA. 2177733, GRB. 1421929, ISR. 0041829, ITL. 0983618, MEX. 131438, SAF. 0732067, SPN. 0439774, STZ. 0556047, SWD. 7304022.

Class 7A

3,850,517.—HIGH SPEED PRINTOUT SYSTEM. NOV. 26, 1974.

Class 7A 1

3,051,041.—IMAGE PROJECTION. AUG. 28, 1962. CAN. 0734194, GRB. 0956359.
3,148,581.—CYLINDRICAL SURFACE PROJECTION APPARATUS. SEPT. 15, 1964.
3,273,999.—IMAGE DEFORMATION UTILIZING A PRISM. SEPT. 20, 1966. AUS. 0274351, CAN. 0840628, FRA. 1367772, GRB. 1034097, ITL. 0699466, SAF. 0002971, SWD. 0306232.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

Class 7A 2

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

Class 7A 2A

3,999,038.—FLARED FUSER ROLLL. DEC. 21, 1976.

Class 7B

3,501,294.—METH OF TREATNG SURFACE OF XIC PLATE W/METAL SALT OF A FATTY ACID TO IMPROVE IMAGE TRANSFER. MAR. 17, 1970. ARG. 0168294, AUS. 0419434, BEL. 0706369, CAN. 0880230, CHL. 0027764, FRA. 1544449, GRB. 1209644, ITL. 0822799, MEX. 0102265, PNM. 0002797, SWD. 0340047, VZL. 0023670.
3,690,754.—CONTROL SYSTEM FOR AN OPTICAL IMAGING SYSTEM. SEPT. 12, 1972. CAN. 0949797, GRB. 1337420.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.
4,066,802.—COLORED XEROGRAPHIC IMAGE TRANSFER PROCESS. JAN. 3, 1978.
4,126,455.—ELECTROSTATOGRAPHIC IMAGING PROCESS AND RELATED APPARATUS. NOV. 21, 1978. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 7C

3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,620,616.—TRANSFER DRUM WITHDRAWAL APPARATUS. NOV. 16, 1971. BEL. 0751487, CAN. 0923543, FRA. 7020458, GRB. 1300267, ITL. 0893835.
3,633,543.—BIASED ELECTRODE TRANSFER APPARATUS. JAN. 11, 1972. CAN. 0914398, GRB. 1337123, JAP. 783769.
3,781,105.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. DEC. 25, 1973. FRA. 7341869, GRB. 1448385.

3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,822,093.—TRANSFER REGULATING APPARATUS. JULY 2, 1974. FRA. 7428422.
3,830,589.—CONDUCTIVE BLOCK TRANSFER SYSTEM. AUG. 20, 1974.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,832,055.—FORAMINOUS VACUUM BIAS ROLL TRANSFER SYSTEM. AUG. 27, 1974. CAN. 0999316.
3,837,741.—CONTROL ARRANGEMENT FOR TRANSFER ROLL POWER SUPPLY. SEPT. 24, 1974.
3,837,883.—IMAGE TRANSFER PROCESS. SEPT. 24, 1974. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.
3,842,800.—TRANSFER ROLLER ASSEMBLY. OCT. 22, 1974. BEL. 0793553, CAN. 9780221, FRA. 7237770, GRB. 1412454, ITL. 0973320, SPN. 0410173, SWD. 7216978.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,847,119.—TRANSFER ROLLER ASSEMBLY. NOV. 12, 1974. ARG. 0196224, ATR. 327002, AUS. 0464751, BEL. 0796983, CAN. 0977206, EGR. 0103979, FRA. 7305277, GER. 0103979, GRB. 1413711, ISR. 0041830, ITL. 0983617, MEX. 131018, SAF. 0722068, SPN. 0413018, STZ. 0558033, SWD. 7304021.
3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,860,436.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. JAN. 14, 1975. FRA. 7341869, GRB. 1448385.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.
3,877,416.—HUMIDITY CORRECTED TRANSFER APPARATUS. APR. 15, 1975. BEL. 0814054, GRB. 1445671, ITL. 1009955, STZ. 0573612.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,901,186.—TRANSFER ROLLER ASSEMBLY. AUG. 26, 1975. BEL. 0816848, FRA. 7423024.
3,924,943.—SEGEMENTED BIASED TRANSFER MEMBER. DEC. 9, 1975.
3,936,175.—INTERNALLY SHIELDED TRANSFER ROLLER. FEB. 3, 1976.
3,942,888.—STEPPED TRANSFER ROLLER. MAR. 9, 1976.
3,957,367.—A COLOR ELECTROSTATOGRAPHIC PRINTING MACHINE. MAY 18, 1976.
3,959,574.—BIASABLE MEMBER AND METHOD FOR MAKING. MAY 25, 1976.
3,994,579.—TRANSFER SYSTEM FOR ELECTROPHOTOGRAPHIC PRINTING. NOV. 30, 1976.
4,014,605.—TRANSFER SYSTEM WITH TAILORED ILLUMINATION. MAR. 29, 1977.
4,023,894.—TRANSFER APPARATUS. MAY 17, 1977.
4,025,182.—A TRANSFER APPARATUS FOR A COLOR ELECTROPHOGRAPHIC PRINTING MACHINE. MAY 24, 1977.
4,055,380.—TRANSFER CHARGE MAINTAINING SYSTEM. OCT. 25, 1977.
4,058,879.—COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICE. NOV. 22, 1977.
4,062,812.—METHOD FOR EXTENDING THE FUNCTIONAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICES. DEC. 13, 1977.
4,087,169.—TRANSFER ROLLER SYSTEM. MAY 2, 1978.
4,098,227.—BIASED FLEXIBLE ELECTRODE TRANSFER. JULY 4, 1978.
4,105,320.—TRANSFER OF CONDUCTIVE PARTICLES. AUG. 8, 1978.
4,110,024.—TRANSFER ASSEMBLY FOR ELECTROSTATIC TRANSFER OF A TONER IMAGE FROM A CURVILINEAR RECORDING. AUG. 29, 1978. BEL. 854404.
4,116,894.—COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF COPOLYMERS. SEPT. 26, 1978.
4,134,147.—TRANSFER HUMIDITY CONTROL DEVICE. JAN. 9, 1979.
4,141,728.—TRANSFER OF DRY DEVELOPED ELECTROSTATIC IMAGE USING PLURAL OPPOSITELY CHARGED FIELDS. FEB. 27, 1979.

Class 7C 1

3,150,003.—APPARATUS FOR TRANSFERRING XEROGRAPHIC IMAGES. SEPT. 22, 1964.
3,150,004.—XEROGRAPHIC TRANSFER APPARATUS. SEPT. 22, 1964.
3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GER. 1597884, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.
3,765,330.—XEROPRINTING EMPLOYING LETTER PRESS SURFACE COVERED WITH A LAYER OF RESISTIVE MATERIAL. OCT. 16, 1973. CAN. 0949806, GRB. 1374651.
3,850,519.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. NOV. 26, 1974. ARG. 0202116, BEL. 0809579, GRB. 1446252, ITL. 1006786, MEX. 0135278, SPN. 0422230, STZ. 0567748, SWD. 7400197, VZL. 0033340.
3,870,515.—METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE. MAR. 11, 1975.
3,877,417.—TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES. APR. 15, 1975.
3,918,403.—CORONA TRANSFER MECHANISM. NOV. 11, 1975.
3,920,325.—MOISTURE STABLE BIAS TRANSFER ROLL. NOV. 18, 1975.
3,966,199.—BELT TRANSFER LOADING SYSTEM. JUNE 29, 1976.
4,014,606.—REPRODUCTION MACHINE WITH TEXTURED TRANSFER ROLLER. MAR. 29, 1977.
4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.
4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.
4,058,306.—DETACK AND STRIPPING SYSTEM. NOV. 15, 1977.
4,076,407.—DUPLEX COPYING TRANSFER SYSTEM. FEB. 28, 1978.
4,077,709.—TRANSFER CHARGE CONTROL SYSTEM. MAR. 7, 1978.
4,080,053.—TRANSFER APPARATUS AND METHOD. MAR. 21, 1978.

Class 7C 1A

3,319,604.—XEROGRAPHIC TRANSFER APPARATUS. MAY 16, 1967.

Class 7C 2

3,132,037.—XEROGRAPHIC TRANSFER METHOD. MAY 5, 1964. CAN. 0727919.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,817,616.—THERMAL CHAMBER FOR DEVELOPABILITY REGULATING APPARATUS. JUNE 18, 1974. CAN. 0991247, GRB. 1439527.
3,838,918.—TRANSFER APPARATUS. OCT. 1, 1974. BEL. 0811434, GRB. 1445243, ITL. 1008903.
3,892,962.—THERMAL CHAMBER FOR A DEVELOPABILITY REGULATING APPARATUS. JULY 1, 1975. CAN. 0991247, GRB. 1439527.

Class 7C 3

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.
3,612,677.—ELECTROSTATIC TRANSFER APPARATUS. OCT. 12, 1971. CAN. 0941220, GRB. 1296742.
3,697,170.—AUTOMATIC DUPLEXING APPARATUS. OCT. 10, 1972. CAN. 0948269.
3,697,171.—SIMULTANEOUS IMAGE TRANSFER. OCT. 10, 1972. ARG. 0192330, AUS. 0461728, BEL. 0777016, CAN. 0948267, FRA. 7146256, GRB. 1368456, ITL. 0944212, MEX. 0124562, SWD. 0366123, VZL. 32765.
3,702,482.—BIAS ROLL TRANSFER. NOV. 7, 1972. ARG. 0191238, BEL. 0777017, CAN. 0962890, FRA. 7146257, GRB. 1368500, ITL. 0944209, MEX. 0126775.

3,734,015.—SINGLE PASS DUPLEXING BY SEQUENTIAL TRANSFER. MAY 22, 1973. ARG. 0192332, BEL. 7777018, CAN. 0948691, FRA. 7146258, GRB. 1368496, ITL. 0944211, MEX. 0124992.
3,902,801.—COLOR CORRECTED PRINTING SYSTEM. SEPT. 2, 1975. GRB. 1465590.
4,093,457.—METHOD OF TRANSFER.

Class 7C 4

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, FRA. 1540696, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.
3,640,249.—TRANSFER APPARATUS. FEB. 8, 1972. BEL. 0758058.
3,647,292.—TRANSFER APPARATUS. MAR. 7, 1972. AUS. 0450919, BEL. 0759452, CAN. 0919004, FGR. 0086978, FRA. 7043065, GRB. 1319148, ITL. 0909441, JAP. 0773213, SPN. 0385845, STZ. 0519187, SWD. 7015876.
3,650,617.—SWITCHING DETECTOR-A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR-B. MAR. 21, 1972.
3,687,545.—SHORT FOCAL LENTH OPTICAL IMAGING SYSTEM. AUG. 29, 1972. BEL. 0747977, CAN. 0913438, FRA. 7011547, GRB. 1300156, ITL. 0898935, JAP. 0731226.
3,729,311.—ELECTROSTATIC TRANSFER METHOD. APR. 24, 1973.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537, GRB. 1429518.

Class 7D

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 7E

3,063,351.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. NOV. 13, 1962. CAN. 0706541.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,687,541.—XEROGRAPHIC DUPLEX TECHNIQUE. AUG. 29, 1972. CAN. 0948268.
3,847,642.—METHOD FOR TRANSFERRING ELECTROSTATOGRAPHICALLY FORMED IMAGES. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,867,168.—TRANSPARENCY. FEB. 18, 1975.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,936,174.—TRANSFER ROLLER WITH STATIONARY INTERNAL ELECTRODE. FEB. 3, 1976.
3,954,332.—REPRODUCTION MACHINE WITH IMPROVED TRANSFER ROLL. MAY 4, 1976.
3,954,333.—TRANSFER ROLL HAVING MEANS FOR MONITORING AND CONTROLLING THE RESITIVITY THEREOF. MAY 4, 1976.
3,977,779.—ELECTROSTATOGRAPHIC TRANSFER WITH AIR. AUG. 31, 1976. GRB. 1459450.

Class 7E 1

3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,685,896.—DUPLICATING METHOD AND APPARATUS. AUG. 22, 1972.
3,845,742.—FUSER ROLL CONSTRUCTION. NOV. 5, 1974. GRB. 1450882.
3,849,062.—REINFORCED FUSER ROLL CONSTRUCTION. NOV. 19, 1974.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.
4,066,802.—COLORED XEROGRAPHIC IMAGE TRANSFER PROCESS. JAN. 3, 1978.

Class 7E 2

3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.

Class 7E 3

3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721 FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.

Class 7E 3A

3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 8

3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,104,692.—DEVICE FOR DETECTING ABNORMAL TEMPERATURE IN FIXER. AUG. 1, 1978.

Class 8A

D.233,414.—TONER BOTTLE OR THE LIKE. OCT. 29, 1974.
3,130,064.—METHOD OF FORMING RESIN PATTERN ON A PAPER RECORD CARD. APR. 21, 1964.
3,778,222.—FIRE PREVENTION APPARATUS. DEC. 11, 1973.
3,830,590.—SORTER APPARATUS OF PRINTER SYSTEM. AUG. 20, 1974. AUS. 0466096, BEL. 0791361, CAN. 0998425, CHL. 0027890, EGR. 0102488, FRA. 7240557, GRB. 1400619, IND. 0137843, ISR. 0040831, ITL. 0970911, MEX. 0128646, NOR. 0135210, NZL. 0168971, PLP. 0008722, PTG. 0058789, SAF. 0728101, SPN. 0408628, STZ. 0560108.
3,834,861.—PRESSURE HEATED FUSER ASSEMBLY. SEPT. 10, 1974. GRB. 1424307.
3,847,391.—STACKING CONTROL APPARATUS. NOV. 12, 1974. ARG. 0194365, AUS. 0454812, BEL. 0783855, CAN. 0969205, FRA. 7218318, GRB. 1365400, ITL. 0955693, MEX. 0128712, SPN. 0403109, STZ. 0557242.
3,848,868.—SHEET SORTING APPARATUS. NOV. 19, 1974. CAN. 1005387, GRB. 1440557.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050, FRA. 7435222.

3,868,744.—CLEANING APPARATUS FOR HEATED PRESSURE ROLL FUSER. MAR. 4, 1975. AUS. 0466542, BEL. 0794569, CAN. 1007407, FRA. 7302888, GRB. 1424132, ITL. 0978560, SPN. 0410976, SWD. 7301015.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
3,998,450.—IMPROVED SORTING APPARATUS. DEC. 21, 1976. GRB. 1433088.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,006,985.—XEROGRAPHIC APPARATUS HAVING TIME CONTROLLED FUSING. FEB. 8, 1977.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,065,586.—FIXING METHOD USING POLYARYLSILOXANES AS RELEASE AGENTS. DEC. 27, 1977.
4,078,286.—HEAT FIXING ROLL FOR ELECTROPHOTOGRAPHIC DUPLICATORS. MAR. 14, 1978.
4,078,948.—FIXING METHOD. MAR. 14, 1978.
4,133,522.—PIVOTING TRAY SORTING APPARATUS. JAN. 9, 1979. CAN. 1011681. GRB. 1455159.
4,144,835.—CONTACT HEAT FIXING APPARATUS. MAR. 20, 1979.
4,146,659.—FUSING TONER ON FUSER MEMBERS MADE OF NOBLE METALS AND ALLOYS THEREOF. MAR. 27, 1979.

Class 8A 1

RE.28,802.—FUSING APPARATUS. MAY 4, 1976. CAN. 0990779, FRA. 7338110, GRB. 1436563.
3,079,483.—XEROGRAPHIC FIXING APPARATUS. FEB. 26, 1963. ARG. 0155449, CAN. 0682500, GRB. 1032955, IND. 0096312.
3,083,623.—TRANSFERRED IMAGE APPARATUS. APR. 2, 1963. CAN. 0701631.
3,219,326.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965. CAN. 0716212.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,409,280.—POROUS DRUM FUSER. NOV. 5, 1968.
3,411,932.—QUALITY XEROGRAPHIC REPRODUCTIONS. NOV. 19, 1968. CAN. 0788948, FRA. 1459094, GER. 1497213, GRB. 1112000, ITL. 0725763, MEX. 0078900.
3,498,592.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0180584, AUS. 0432632, BEL. 0733403, CAN. 0878082, CZC. 0164830, FRA. 6917080, GRB. 1269716, ITL. 0864984, MEX. 0111516, PNM. 0001417, SPN. 0367614, STZ. 0506821, SWD. 0345328, TIW. 0006603, USR. 0340215.
3,519,253.—SELECTIVE XEROGRAPHIC FUSER. JULY 7, 1970. ARG. 0168753, ATR. 0293871, AUS. 0416089, BEL. 0704925, CAN. 0843377, CHL. 0023289, CLB. 0017682, DNK. 0123893, FRA. 1540701, GRB. 1193355, GUA. 0002145, HUN. 0157550, ITL. 0830722, JAM. 0001850, MEX. 0107890, PRU. 0009344, SAF. 0676018, SPN. 0345919, STZ. 0470698, SWD. 0322690, TRD. 0000113, URG. 0008846, USR. 0372852, VZL. 0026101.
3,535,492.—FUSING APPARATUS. OCT. 20, 1970. ARG. 0181204, BEL. 0733663, CAN. 0872978, FRA. 6917190, GRB. 1266932, HOL. 149013, ITL. 0865914, MEX. 0110755.
3,623,710.—FIXING ARRANGEMENT. NOV. 30, 1971.
3,648,991.—METHOD AND APPARATUS FOR SELECTIVE FUSING. MAR. 14, 1972.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,770,346.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. NOV. 6, 1973. CAN. 1002582, GRB. 1421863.
3,781,517.—FUSER THERMAL PROTECTOR. DEC. 25, 1973. GRB. 1441702.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,826,892.—FUSING APPARATUS. JULY 30, 1974. CAN. 0990779, FRA. 7338110, GRB. 1436563.
3,849,905.—FUSING APPARATUS. NOV. 26, 1974.
3,849,907.—FUSING APPARATUS. NOV. 26, 1974.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,874,892.—ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER. APR. 1, 1975. CAN. 0980405, GRB. 1374652.
3,898,424.—RADIANT FUSER XEROGRAPHIC REPRODUCING APPARATUS. AUG. 5, 1975.
3,907,492.—FUSING APPARATUS. SEPT. 23, 1975. CAN. 0990779, GRB. 1436563.
3,939,326.—DUAL RIBBON FUSER. FEB. 17, 1976.
3,944,784.—DUAL RIBBON FUSER. MAR. 16, 1976.
3,953,709.—TWO SOURCE RADIANT FUSER FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 27, 1976.
3,987,757.—PAPER HANDLING IMPROVEMENTS IN RADIANT FUSER VIA CORRUGATION OF PAPER. OCT. 26, 1976.
4,001,622.—DIRECTIONAL SOURCES OF ELECTROMAGNETIC RADIATION. JAN. 4, 1977. GRB. 1443340.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,021,641.—RADIANT FUSER FOR FIXING TONER IMAGES. MAY 3, 1977.
4,056,706.—APPARATUS & METHOD FOR EXTENDING FUSER RELEASE LIFE. NOV. 1, 1977.
4,064,313.—HEAT FIXING MEMBER FOR ELECTROPHOTOGRAPHIC COPIERS. DEC. 20, 1977.
4,078,285.—HARD ALLOY FUSER MEMBERS. MAR. 14, 1978.
4,092,099.—COPIER PAPER DELIVERY MEANS IN A HEAT-FIXING DEVICE OF A COPYING MACHINE. MAY 30, 1978.
4,102,681.—TRANSFER AND FUSING METHOD. JULY 25, 1978. CAN. 990779, FRA. 7338110.

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3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,465,203.—FLASH LAMP FOR ELECTROSCOPIC TONER. SEPT. 2, 1969. CAN. 0843526, GER. 1589315, GRB. 1185687, JAP. 0758339.
3,474,223.—SELECTIVE FLASH FUSING. OCT. 21, 1969. CAN. 0851811, FRA. 1546257, GRB. 1208770, JAP. 0558445.
3,529,129.—REFLECTION TYPE FLASH FUSER. SEPT. 15, 1970. ARG. 0180678, BEL. 0728716, CAN. 0855311, FRA. 6004567, GRB. 1252465, ITL. 0866971, JAP. 0661180, MEX. 0107835.
3,566,076.—TONER FIXING APPARATUS. FEB. 23, 1971. CAN. 0913164, GRB. 1256471.
3,655,280.—XEROGRAPHIC FUSING METHOD AND APPARATUS. APR. 11, 1972.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,865,081.—MAGNETIC BRUSH DEVELOPING APPARATUS. FEB. 11, 1975.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,394.—READ/WRITE APPARATUS FOR MAGNETIC RECORDERS. SEPT. 2, 1975.
3,920,952.—DUPLEX FUSING APPARATUS AND METHOD. NOV. 18, 1975.
3,935,424.—FLASH FUSING APPARATUS. JAN. 27, 1976.
3,944,783.—HIGH EFFICIENCY NON CAVITY RADIANT METHOD AND APPARATUS. MAR. 16, 1976.
3,980,424.—FUSER CLEANING ROLLER. SEPT. 14, 1976.
4,001,541.—FLASH FUSING SYSTEM WITH ENERGY CONTROL. JAN. 4, 1977.
4,027,199.—FLASH LAMP MODULATOR SYSTEM. MAY 31, 1977.
4,039,770.—INTERFACE SYSTEM TO CONTROL FLASH LAMP. AUG. 2, 1977.
4,050,801.—RELEASE AGENT APPLICATION SYSTEM FOR A HEATED FUSER ROLL. SEPT. 27, 1977.
4,050,803.—QUICK RELEASE MECHANISM FOR A BACKUP ROLL FUSER EMPLOYED IN A COPIER APPARATUS. SEPT. 27, 1977.
4,090,108.—INTERFACE SYSTEM TO CONTROL FLASH LAMP. MAY 16, 1978.

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3,053,962.—XEROGRAPHIC FUSING APPARATUS. SEPT. 11, 1962. CAN. 0657396, GER. 1165413, GRB. 0999763.

3,357,401.—XEROGRAPHIC FUSER MONITORING APPARATUS. DEC. 12, 1967.
3,432,639.—FUSING APPARATUS. MAR. 11, 1969. CAN. 0851810, GRB. 1194234, JAP. 0608702.
3,437,407.—XEROGRAPHIC FUSING SYSTEM. APR. 8, 1969. CAN. 0842370, JAP. 0758338.
3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,449,546.—INFRA-RED HEATER. JUNE 10, 1969. ARG. 0170237, ATR. 0303518, AUS. 0402657, BEL. 0700101, BRA. 6788714, CAN. 0852819, CHL. 0023085, DNK. 0118703, FRA. 1527629, GRB. 1187481, ITL. 0805313, MEX. 0101251, NOR. 0123480, PLD. 0068551, PRU. 0009320, SAF. 0673601, SPN. 0341906, STZ. 0499143, SWD. 0332936, URG. 0008615, VZL. 0026103.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,558,853.—FUSER SYSTEM FOR COPYING MACHINE. JAN. 26, 1971. ARG. 0186145, ATR. 0309984, AUS. 0446113, BEL. 0750389, BRA. 7019023, CAN. 0874013, CZC. 0168526, EGR. 0083065, FRA. 7017316, GRB. 1309129, ITL. 0893097, JAP. 0836943, MEX. 0117915, NZL. 0160101, SPN. 0379651, STZ. 0506817, SWD. 0357840, TIW. 0006834, VZL. 0032597.
3,588,445.—FUSER CONTROL CIRCUIT. JUNE 28, 1971.
3,735,092.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. MAY 22, 1973. CAN. 0991254, GRB. 1406655.
3,781,516.—FUSER CONTROL SYSTEM. DEC. 25, 1973. MEX. 0135422.
3,790,747.—REGULATOR FOR XEROGRAPHIC FUSING APPARATUS. FEB. 5, 1974. ARG. 0200245, AUS. 0467385, BEL. 0789339, CAN. 0991252, FRA. 7234199, GRB. 1397586, ITL. 0972690, MEX. 0129168, SPN. 0409974, STZ. 0554008, SWD. 7215167, VZL. 0032607.
3,833,794.—FIXING UNIT FOR USE IN A DUPLICATING APPARATUS. SEPT. 3, 1974.
3,851,144.—FEEDBACK FUSER FOR 730S. NOV. 26, 1974.
3,989,370.—ADAPTIVE FUSER CONTROLLER. NOV. 2, 1976.
3,989,926.—DEVICE FOR PREVENTING OVERHEATING OF ELECTROPHOTOGRAPHIC FIXING DEVICE. NOV. 2, 1976.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

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3,076,083.—XEROGRAPHIC FIXING APPARATUS. JAN. 29, 1963.

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3,349,702.—FUSER HAVING HEATED AND UNHEATED PORTIONS FOR PRINT FIXING PURPOSES. OCT. 31, 1967. CAN. 0833789, MEX. 0096468.
3,356,831.—XEROGRAPHIC FUSING APPARATUS. DEC. 5, 1967. CAN. 0798466, FRA. 1465786, GER. 1497228, GRB. 1117339, ITL. 0749552, JAP. 0512652.
3,584,195.—HEAT FIXING APPARATUS. JUNE 8, 1971. GRB. 1322354.
3,718,390.—MICROFICHE INDEXER. FEB. 27, 1973. ARG. 0190620, BEL. 0768712, CAN. 0946659, GRB. 1350656, ITL. 0927453, MEX. 0121626, SWD. 7107727.
3,788,873.—FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER. JAN. 29, 1974.
3,810,735.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAY 14, 1974.
3,849,628.—NON-CONTACT TEMPERATURE SENSOR FOR ROLL FUSER OF A XEROGRAPHIC REPRODUCTION APPARATUS. NOV. 19, 1974. CAN. 1002583, GRB. 1322612.
3,881,859.—STRIPPER FINGER DESIGN TO PREVENT OIL-ON-THE-COPY. MAY 6, 1975.
3,900,590.—XEROGRAPHIC FUSING APPARATUS. AUG. 19, 1975. CAN. 0992614, GRB. 1192444.
3,904,354.—RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL. SEPT. 9, 1975.
3,937,637.—ROLL CONTACT FUSER. FEB. 10, 1976.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
3,976,814.—FUSING DEVICE & METHOD. AUG. 24, 1976.
3,997,691.—FUSING SURFACE AND METHOD FOR FIXING TONER. DEC. 14, 1976.
4,000,339.—FUSING SURFACE & METHOD FOR FIXING XEROGRAPHIC TONER. DEC. 28, 1976.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,029,827.—MERCAPTO FUNCTIONAL POLYORGANOSILOKANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS. JUNE 14, 1977. SPN. 0439743.
4,054,410.—FUSING DEVICE. OCT. 18, 1977.
4,056,706.—APPARATUS & METHOD FOR EXTENDING FUSER RELEASE LIFE. NOV. 1, 1977. FRA 7611767.
4,075,390.—FUSING SURFACE AND METHOD FOR FIXING TONER. FEB. 21, 1978.
4,101,686.—METHOD OF FUSING TONER IMAGES USING FUNCTIONALIZED POLYMERIC RELEASE AGENTS. JULY 18, 1978. BEL. 831662, FRA. 7523193.
4,150,181.—FIXING METHOD USING POLYSILOXANE-FLUOROCARBON BLENDS AS RELEASE AGENTS. APR. 17, 1979.

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3,256,002.—XEROGRAPHIC FIXING DEVICE. JUNE 14, 1966. ADN. 0000470, AUS. 0295646, BRS. 00J3738, BRU. 0000569, CAN. 0796441, FIJ. 0000343, GHA. 0000995, GIB. 1089537, GIE. 0006669, GRB. 1089537, GUR. 1089537, HGK. 0009269, ISR. 0030229, JAP. 0537119, JER. 0000P98, KEN. 0001745, MAU. 1917571, MLS. 0015169, NIG. 0001618, NZL. 0148733, SBH. 0005369, SGP. 0008369, SHL. 0000018, SLN. 3677286, SRK. 0000386, STZ. 0458077, UGD. 0000369.
3,268,351.—XEROGRAPHIC FIXING METHOD AND APPARATUS. AUG. 23, 1966. JAP. 0489660.
3,291,466.—XEROGRAPHIC FIXING DEVICE. DEC. 13, 1966. CAN. 0800935, FRA. 1458647, GRB. 1122628, ITL. 0729649, JAP. 0524526, MEX. 0090836.
3,324,791.—XEROGRAPHIC ROLLER FUSER DRIVE APPARATUS. JUNE 13, 1967. CAN. 0825903, GRB. 1135744, JAP. 0512655, STZ. 0520889.
3,327,096.—TEMPERATURE CONTROL CIRCUIT. JUNE 20, 1967. CAN. 0797970, FRA. 1448641, GRB. 1113451, ITL. 0729649, JAP. 0572184, MEX. 0085994.
3,331,592.—XEROGRAPHIC FUSING APPARATUS. JULY 18, 1967. CAN. 0823589, JAP. 0512657, MEX. 0108575.
3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,435,500.—PRESSURE ROLL AND METHOD OF MANUFACTURING. APR. 1, 1969. ARG. 0153406, AUS. 0408490, BEL. 0670480, BRA. 0083780, CAN. 0832922, FRA. 1450156, GER. 1546792, GRB. 1124036, ITL. 0730679, JAP. 0669366, MEX. 0107366, VZL. 0024008.
3,437,032.—HEATED FUSER ROLL. APR. 8, 1969. ARG. 0155221, AUS. 0043081, BEL. 0683308, CAN. 0800936, FRA. 1484969, GRB. 1137227, ITL. 0773369, JAP. 1071499, MEX. 0093105, SPN. 0328427, STZ. 0467476, SWD. 0321410, VZL. 0023990.
3,449,548.—FUSING DEVICE. JUNE 10, 1969.
3,498,596.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0181805, AUS. 0428652, BEL. 0733408, BRA. 6909134, CAN. 0860450, CZC. 0150764, FRA. 6917085, GRB. 1258152, ITL. 0865073, MEX. 0111517, PLD. 0079991, PNM. 0002166, SPN. 0367312, STZ. 0505411, SWD. 0345329, TIW. 0006194, USR. 0230669, VZL. 0025073.
3,539,161.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIALS. NOV. 10, 1970. CAN. 0889987.
3,612,820.—HEAT FIXING APPARATUS FOR LENGTHY FUSIBLE MATERIALS. OCT. 12, 1971.
3,649,992.—CLEANING APPARATUS FOR FUSING SYSTEM. MAR. 21, 1972. CAN. 0980517, GRB. 1340684.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,690,176.—TEMPERATURE SENSING APPARATUS. SEPT. 12, 1972. GRB. 1383087.
3,718,116.—OIL DISPENSING APPARATUS. FEB. 27, 1973. CAN. 0984895.
3,745,972.—WICKING APPARATUS. JULY 17, 1973. CAN. 0991251, GRB. 1397626.
3,751,216.—FUSER ROLL ASSEMBLY. AUG. 7, 1973.
3,754,819.—APPARATUS FOR PLACING ROLLERS IN CONTACT IN A PRESSURE FUSER ASSEMBLY. AUG. 28, 1973.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOPOETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,796,183.—FREE FLOATING PRESSURE BIASING APPARATUS FOR CLEANING ROLL FUSER. MAR. 12, 1974.
3,799,401.—SILICONE OIL CAPACITY CONTROL USING POLYURETHANE BELT. MAR. 26, 1974.

3,820,591.—APPARATUS FOR SENSING DIMENSION OF SHEETS OF MATERL TO BE TRNPRTD THROUGH ELCTRSTIC REPRDCTN M. JUNE 28, 1974. CAN. 1004290.

3,831,553.—WICK FOR OIL DISPENSING APPARATUS. AUG. 27, 1974. CAN. 0984895.

3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,861,860.—DRY FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.

3,881,085.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. APR. 29, 1975. BEL. 0808310, GRB. 1447679.

3,883,291.—OIL APPLICATOR FOR REPRODUCTION MACHINE FUSER. MAY 13, 1975. BEL. 0822048, FRA. 7438048, SPN. 0432090.

3,883,292.—SLEEVELESS PRESSURE ROLL CLEANER. MAY 13, 1975.

3,883,293.—PRESSURE ROLL CONSTRUCTION. MAY 13, 1975.

3,902,845.—METAL FOAM UNDER CONFORMABLE SURFACE REPLACEABLE. SEPT. 2, 1975.

3,906,800.—REUSABLE NIP MEASURING DEVICE AND METHOD. SEPT. 23, 1975.

3,907,493.—VISCO-ELASTIC DAMPENER MECHANISM FOR FUSER ASSEMBLY. SEPT. 23, 1975.

3,908,589.—STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE. SEPT. 30, 1975.

3,912,901.—PFA TEFLON SLEEVED CHOW PRESSURE ROLL. OCT. 14, 1975.

3,913,521.—COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER. OCT. 21, 1975.

3,918,397.—CONTACT FUSING APP FOR FIXING TONER IMAGES TO A SUPPORT MEMBER. NOV. 11, 1975.

3,918,804.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXNG TNR IMGS TO. NOV. 11, 1975.

3,921,573.—CLEANING SYSTEM FOR ELECTROSTATIC REPRODUCING APPARATUS. NOV. 25, 1975.

3,924,564.—FUSER APPARATUS HAVING AN ARTICULATED RELEASE MATERIAL DISPENSER. DEC. 9, 1975.

3,926,058.—CONTACT ARC REPLICATION DEVICE. DEC. 16, 1975.

3,929,094.—ROLL FUSER. DEC. 30, 1975.

3,929,095.—ROLL FUSER. DEC. 30, 1975.

3,929,096.—ROLL FUSER. DEC. 30, 1975.

3,934,113.—ROLL FUSER APPARATUS AND MOUNTING ARRANGEMENT THEREFOR. JAN. 20, 1976.

3,934,547.—RENEWABLE CHOW FUSER COATING. JAN. 27, 1976.

3,935,836.—METERING BLADE FOR A FUSER ROLL. FEB. 3, 1976.

3,938,950.—STRIPPING APPARATUS. FEB. 17, 1976.

3,940,238.—CLEANING STRUCTURE FOR AN ELASTOMERIC FUSER MEMBER. FEB. 24, 1976.

3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.

3,941,558.—A CONTACT AND HEATING FIXING DEVICE FOR ELECTROPHOTOGRAPHY. MAR. 2, 1976.

3,942,887.—DRIVE MECHANISM FOR A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. MAR. 9, 1976.

3,948,214.—INSTANT START FUSING APPARATUS. APR. 6, 1976.

3,951,538.—A PERMANENTLY NIPPED CONTACT IMAGE FUSER SYSTEM INCORPORATING A ONE-WAY CLUTCH. APR. 20, 1976.

3,955,916.—FUSER ROLL SHEET STRIPPING APPARATUS. MAY 11, 1976.

3,965,331.—DUAL MODE ROLL FUSER. JUNE 22, 1976.

3,965,332.—SELECTIVE FUSING APPARATUS. JUNE 22, 1976.

3,965,853.—CONTACT FUSER ASSEMBLY. JUNE 29, 1976.

3,965,973.—TEMPERATURE SENSING DEVICE. JUNE 29, 1976.

3,966,394.—PLURAL CLEANING ROLLS ASSEMBLY. JUNE 29, 1976.

3,968,343.—FUSER ROLL TEMPERATURE REGULATOR PROBE. JULY 6, 1976.

3,970,038.—ROLL FUSER. JULY 20, 1976.

3,973,844.—LATCHING MECHANISM FOR THE BACK-UP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. AUG. 10, 1976.

3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.

3,980,423.—FUSER CLEANING ROLLER ASSEMBLY. SEPT. 14, 1976.

3,981,085.—AIR STRIPPING DEVICE FOR ELASTOMERIC SURFACE. SEPT. 21, 1976.

3,989,005.—IMPROVED OIL METERING BLADE DEVICE. NOV. 2, 1976.

3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.

3,996,886.—IMPROVED OIL METERING BLADE HOLDER ASSEMBLY. DEC. 14, 1976.

3,996,887.—IMPROVED OIL METERING BLADE HOLDING DEVICE. DEC. 14, 1976.

3,999,510.—HIGH SURFACE ENERGY CLEANING ROLL. DEC. 28, 1976.

4,000,394.—FUSER THERMAL DETECTOR. DEC. 28, 1976.

4,000,957.—CONTACT FUSER AND RELEASE AGENT APPLICATOR THEREFOR. JAN. 4, 1977.

4,000,963.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. JAN. 4, 1977.

4,004,549.—ROLL FUSER. JAN. 25, 1977.

4,008,955.—FUSER ASSEMBLY FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 22, 1977.

4,011,831.—IMPROVED OIL METERING BLADE LOADING ASSEMBLY. MAR. 15, 1977.

4,013,400.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. MAR. 22, 1977.

4,018,555.—CLEANING APPARATUS FOR ROLL FUSER. APR. 19, 1977.

4,025,751.—FUSER ROLL SLEEVE. MAY 24, 1977.

4,026,238.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXING TONER IMAGE. MAY 31, 1977.

4,028,050—STRIPPER FINGER COMBINATION MOUNTING MEANS THEREFOR. JUNE 7, 1977.

4,034,188.—HEAT FIXING DEVICE FOR COPYING MACHINE. JULY 5, 1977.

4,034,706.—DUAL RELEASE AGENT CU-VITON FUSER. JULY 12, 1977.

4,042,804.—ROLL FUSER APPARATUS. AUG. 16, 1977.

4,043,747.—PRESSURE HEAT FIXING DEVICE. AUG. 23, 1977.

4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.

4,045,164.—USE OF SILICONE OIL AS A POLYETHYLENE OXIDATION RETARDANT IN A TONER IMAGE FUSING APPARATUS. AUG. 30, 1977. GRB. 1498469

4,047,885.—ROTATING WICK OIL DISPENSING SYSTEM. SEPT. 13, 1977.

4,050,801.—RELEASE AGENT APPLICATION SYSTEM FOR A HEATED FUSER ROLL. SEPT. 27, 1977.

4,050,803.—QUICK RELEASE MECHANISM FOR A BACKUP ROLL FUSER EMPLOYED IN A COPIER APPARATUS. SEPT. 27, 1977.

4,050,886.—ROLL FUSER. SEPT. 27, 1977. BEL. 858880.

4,052,150.—OIL WETTED FUSER ROLL STRIPPING APPARATUS. OCT. 4, 1977.

4,062,534.—STRIPPER ARRANGEMENT FOR REMOVING VARIOUS SIZED COPY SHEETS FROM FUSER ROLL. DEC. 13, 1977.

4,064,313.—HEAT FIXING MEMBER FOR ELECTROPHOTOGRAPHIC COPIERS. DEC. 20, 1977.

4,071,735.—EXTERNALLY HEATED LOW-POWER ROLL FUSER. JAN. 31, 1978.

4,075,707.—PROGRAMMED DEVICE CONTROLLER. FEB. 21, 1978.

4,079,227.—CONTACT HEAT FIXING APPARATUS FOR ELECTROPHOTOGRAPHIC REPRODUCTION MACHINES. MAR. 14, 1978.

4,079,228.—PRESSURIZED SOLVENT FUSING. MAR. 14, 1978.

4,079,229.—CONTACTING AND FIXING HEATING APPARATUS. MAR. 14, 1978.

4,080,159.—TILTING PAD STRIPPER FINGER. MAR. 21, 1978.

4,081,213.—FUSER DRIVE SYSTEM. MAR. 28, 1978.

4,082,137.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING AN ELECTROSTATOGRAPHIC MACHINE. APR. 4, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.

4,083,092.—SLEEVED ORGANIC RUBBER PRESSSURE ROLLS. APR. 11, 1978.

4,083,322.—FUSER WICK. APR. 11, 1978.

4,085,794.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. APR. 25, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.

4,087,676.—FIXING APPARATUS WITH HEAT AND PRESSURE FOR ELECTROPHOTOGRAPHIC COPIERS. MAY 2, 1978.
4,101,267.—ROLL FUSER CLEANING SYSTEM. JULY 18, 1978. BEL. 846861, FRA. 7630971.
4,114,021.—HEAT ROLL FIXING DEVICE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. SEPT. 12, 1978.
4,119,831.—CONTACT PRESSURE ADJUSTING DEVICE IN HEATING PRESSING FIXING APPARATUS FOR ELECTROPHOTOGRAPHIC. OCT. 10, 1978.
4,149,797.—SLEEVED ORGANIC RUBBER PRESSURE ROLLS. APR. 17, 1979.
4,156,524.—ROLL FUSER STRIPPING MECHANISM. MAY 29, 1979.

Class 8A 3

3,180,971.—XEROGRAPHIC FUSING APPARATUS. APR. 27, 1965. CAN. 0734734, GRB. 1027904, JAP. 0524355.
3,219,799.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965.
3,604,892.—FUSING APPARATUS. SEPT. 14, 1971.
3,856,460.—DEVELOPING SYSTEM FOR FILM BY ADIABACTIC HEAT FLOW. DEC. 24, 1974.

Class 8A 4

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 8B

3,049,810.—XEROGRAPHIC FUSING APPARATUS. AUG. 21, 1962. CAN. 0740393.
3,117,847.—XEROGRAPHIC POWDER IMAGE FIXING APPARATUS. JAN. 14, 1964.
3,132,047.—XEROGRAPHIC FIXING APPARATUS. MAY 5, 1964. AUS. 0266991, CAN. 0713996, FRA. 1332228, GER. 1571130, GRB. 1012444, JAP. 0835352.
3,148,078.—XEROGRAPHIC FUSING METHOD. SEPT. 8, 1964.
3,149,931.—XEROGRAPHIC VAPOR FUSING APPARATUS. SEPT. 22, 1964. CAN. 0758518.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,215,116.—VAPOR FUSING APPARATUS. NOV. 2, 1965.
3,704,524.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 5, 1972. ARG. 0188616, BEL. 0779806, CAN. 0950655, FRA. 7208101, GRB. 1385328, MEX. 0126261.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,934,546.—APPARATUS FOR FIXING WITH SOLVENT VAPORS. JAN. 27, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.

Class 8B 1

3,070,900.—XEROGRAPHIC FIXING APPARATUS. JAN. 1, 1963. CAN. 0686166.
3,078,589.—XEROGRAPHIC FUSING APPARATUS. FEB. 26, 1963. CAN. 0609621, GRB. 0859788.
3,140,159.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,140,160.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,199,223.—XEROGRAPHIC FUSING AND DRYING APPARATUS. AUG. 10, 1965.
3,288,624.—VAPOR FUSING METHOD FOR XEROGRAPHIC POWDER IMAGES. NOV. 29, 1966.

Class 8C

3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,386,822.—SOLVENT CAPSULE FIXING OF POWDER IMAGES. JUNE 4, 1968. CAN. 0712993, FRA. 1430471, GER. 1497196, GRB. 1087201, HOL. 0132775, ITL. 0745341, JAP. 0741995.
3,893,760.—TRANSFER APPARATUS. JULY 8, 1975.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.
4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.
4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.
4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES. NOV. 11, 1978.

Class 8D

3,493,412.—TRANSFERRING XEROGRAPHIC TONER IMAGES TO A SOLID CRYSTALLINE PLASTICIZER COATED RECEIVING SURFA. FEB. 3, 1970. CAN. 0880837, MEX. 0096609.
3,640,746.—ADHESIVE CONTACT ELECTRIFICATION IMAGING. FEB. 8, 1972.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 8E

3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721, FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,799,827.—PROCESS FOR PROTECTING THE SURFACE OF AN IMAGE. MAR. 26, 1974.
3,816,066.—XEROGRAPHIC FIXING DEVICE. JUNE 11, 1974.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,888,622.—TEMPERATURE SENSING DEVICE. JUNE 10, 1975.
3,928,656.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH PRESSURE SENSITIVE TONER. DEC. 23, 1975. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.
3,934,477.—TEMPERATURE SENSING DEVICE. JAN. 27, 1976.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
4,055,143.—RELEASE MATERIAL APPLICATION SEAL. OCT. 25, 1977.

Class 8E 1

3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 9

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.
3,980,494.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. SEPT. 14, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,093,369.—CLEANING SYSTEM. JUNE 6, 1978.

Class 9A

RE29818.—TONER-RECLAIMING SYSTEM-REISSUE OF PATENT 3,641,979 ISSUED FEB. 15, 1972. OCT. 31, 1978. CAN. 913351.
T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,552,850.—LUBRICATED BLADE CLEANING OF IMAGING PHOTOCONDUCTIVE MEMBERS. JAN. 5, 1971. ALB. 0003931, ARG. 0172544, ATR. 0300568, AUS. 0438884, BEL. 0727561, BRA. 6898275, BUR. 0000041, CAM. 0000453, CAN. 0869669, CHL. 0024409, CLB. 0017926, COR. 000947A, DNK. 0122738, EGR. 0075946, EIR. 0032784, FRA. 6902175, GNR. 0000043, GRB. 1259513, GRK. 0039239, IND. 0119582, ISR. 0031502, ITL. 0854622, LIB. P272693, LXB. 0057856, MEX.

0106799, MLG. 0003059, MLW. 00MW769, MNC. 8146975, MRC. 0014725, NOR. 0128683, NZL. 0155207, PAK. 0120897, PLD. 0017650, PLP. 0006639, PNM. 0001979, PRU. 0009588, PTG. 0051062, RHD. 5569489, SAF. 6970696, SPN. 0363130, STZ. 0493016, SWD. 0346398, TGR. 0000550, URG. 0009736, USR. 0385466, VTM. 0001840, VZL. 0023692, ZMB. 0176973.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,717,409.—CLEANING OF ELECTROSTATOGRAPHIC SURFACES. FEB. 20, 1973.

3,724,019.—WIPER BLADE CLEANING APPARATUS FOR XEROGRAPHIC MACHINES. APR. 3, 1973. CAN. 991248.

3,724,020.—WIPER BLADE CLEANER FOR XEROGRAPHIC MACHINES. APR. 3, 1973. ARG. 0194951, BEL. 0783490, CAN. 0991249, FRA. 7216778, GER. 2220821, GRB. 1399156, ITL. 0955404, MEX. 0127875.

3,838,472.—TONER CLEANING APPARATUS. OCT. 1, 1974. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.

3,847,480.—CONTINOUS BLADE CLEANE R. NOV. 12, 1974.

3,848,992.—DEVELOPER BLADE CLEANING. NOV. 19, 1974. FRA. 7415394, GRB. 1443128, ITL. 0010212.

3,848,993.—SUPPORTED DEVELOPER BLADE CLEANING. NOV. 19, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,854,814.—TRANSLATING DWELL CLEANING SYSTEM. DEC. 17, 1974.

3,871,762.—BLADE CLEANING SYSTEM. MAR. 18, 1975.

3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.

3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.

3,927,937.—CLEANING ASSEMBLY FOR AN ELECTROSTATOGRAPHIC DEVICE. DEC. 23, 1975. SPN. 0420425.

3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.

3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,950,092.—CLEANING TRANSPORTING & SORTING APPARATUS & REPRODUCING MACHINE. APR. 13, 1976.

3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

3,973,845.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. AUG. 10, 1976.

3,977,898.—METHOD FOR CLEANING A SURFACE SUPPORT. AUG. 31, 1976. GRB. 1438660.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,007,982.—METHOD AND APPARATUS FOR ULTRASONICALLY CLEANING A PHOTOCONDUCTIVE SURFACE. FEB. 15, 1977.

4,030,824.—A REPRODUCING APPARATUS HAVING AN IMPROVED IMAGING SURFACE CLEANING SYSTEM. JUNE 21, 1977.

4,042,415.—METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE. AUG. 16, 1977.

4,043,659.—CLEANING BLADE TONER ARRESTOR. AUG. 23, 1977.

4,051,536.—ELECTRONIC HALFTONE IMAGING SYSTEM. SEPT. 27, 1977.

4,054,381.—TONER FILTER ARRANGEMENT. OCT. 18, 1977.

4,083,633.—BLADE CLEANING HOLDER. APR. 11, 1978.

4,111,545.—VIBRATING BLADE CLEANER. SEPT. 5, 1978.

4,123,154.—COMBINED CORONA GENERATOR AND IMAGING SURFACE CLEANER. OCT. 31, 1978.

4,131,359.—SENSITIVE MEDIUM CLEANER FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE. DEC. 26, 1978.

4,145,137.—ELECTROPHOTOGRAPHIC REPRODUCING MACHINE BLADE CLEANING APPARATUS. MAR. 20, 1979.

4,158,498.—BLADE DEVELOPING SYSTEM FOR A REPRODUCING APPARATUS. JUNE 19, 1979.

Class 9A 1

3,099,856.—WEB CLEANER APPARATUS. AUG. 6, 1963. ARG. 0146853. CAN. 0760369, GRB. 1032957, IND. 0096310, JAP. 0481944.

3,149,356.—XEROGRAPHIC PLATE CLEANING APPARATUS. SEPT. 22, 1964.

3,186,838.—XEROGRAPHIC PLATE CLEANING METHOD UTILIZING THE RELATIVE MOVEMENT OF A CLEANING WEB. JUNE 1, 1965. CAN. 0858757, FRA. 1435510, GER. 1497242, GRB. 1094224, ITL. 0761145.

3,190,198.—XEROGRAPHIC CLEANING APPARATUS. JUNE 22, 1965.

3,337,891.—PLATE CLEANING AND TRANSPORTING APPARATUS. AUG. 29, 1967.

3,380,355.—XEROGRAPHIC CLEANING APPARATUS. APR. 30, 1968. CAN. 0819048.

3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

3,526,457.—CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINES. SEPT. 1, 1970. CAN. 0880402, GRB. 1225287.

3,615,397.—METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES. OCT. 26, 1971.

3,624,858.—CLEANING APPARATUS. DEC. 7, 1971.

3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.

3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.

3,781,107.—CLEANING APPARATUS. DEC. 25, 1973.

3,867,170.—METHOD FOR CLEANING LIQUID DEVELOPERS. FEB. 18, 1975. CAN. 0906336, GRB. 1339904.

3,879,785.—CLEANING APPARATUS. APR. 29, 1975.

4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.

4,089,683.—LIQUID DEVELOPER CLEANING MEANS. MAY 16, 1978.

4,110,035.—CLEANING SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. AUG. 29, 1978.

Class 9A 2

3,477,450.—BRUSH RECLAIMING. NOV. 11, 1969. GRB. 1206539.

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 086· 392.

3,610,693.—METHOD OF MAKING A CYLINDRICAL BRUSH. OCT. 5, 1971. CAN. 0944415, GRB. 1332920, JAP. 0758464.

3,617,123.—XEROGRAPHIC CLEANING APPARATUS. NOV. 2, 1971.

3,634,077.—METHOD AND APPARATUS FOR REMOVING A RESIDUAL IMAGE IN AN ELECTROSTATIC COPYING SYSTEM. JAN. 11, 1972. BEL. 0737956, CAN. 0896611, FRA. 6929217, GRB. 1259960, ITL. 0870232, JAP. 0742513.

3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.

3,766,593.—CLEANING APPARATUS FOR INSULATING SURFACES. OCT. 23, 1973. ARG. 0194956, AUS. 0460978, BEL. 0784898, CAN. 0990017, FRA. 7219012, GRB. 1399900, ITL. 0960138, MEX. 0127720. SPN. 404266, STZ. 0538310, SWD. 7208414, VZL. 0032065.

3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

4,113,376.—CLEANING APPARATUS FOR REPRODUCING MACHINE. SEPT. 12, 1978.

4,134,673.—DUAL BRUSH CLEANING APPARATUS. JAN. 16, 1979.

Class 9A 2A

3,278,972.—XEROGRAPHIC PLATE CLEANING APPARATUS. OCT. 18, 1966. CAN. 0774795, FRA. 1458646, GER. 1497218, GRB. 1122624, ITL. 0729648, JAP. 0512649.

3,534,427.—CLEANING APPARATUS FOR ELECTROSTATIC PRINTING MACHINES. OCT. 20, 1970. AUS. 0425369, BEL. 0729977, CAN. 0873426, CZC. 0157666, FRA. 6907700, GRB. 1238117, HUN. 0158312, ITL. 0876795, JAP. 0645593, SPN. 0364889, SWD. 0345533, USR. 0372853.

3,590,412.—BRUSH CLEANING DEVICE FOR ELECTROSTATIC MACHINES. JULY 6, 1971. CAN. 0930107, GRB. 1248521, JAP. 0832526.

3,660,863.—CLEANING APPARATUS. MAY 9, 1972. ARG. 0188292, ATR. 0324838, AUS. 0445312, BEL. 0752937, CAN. 0925659, CHL. 0027132, DNK. 0129483, EGR. 0084130, FRA. 7024664. GRB. 1259446, GUA. 0002676, IND. 0127312, ITL. 0900201, MEX. 0115163, NOR. 0133164, NZL. 0160666, PLD. 0081341, PLP. 0007492, PNM. 0002014, PTG. 0054074, SAF. 0704533, SPN. 0381388, STZ. 0514165, SWD. 0359942, TIW. 0007784, USR. 0384250, VZL. 0032417.

3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.

3,740,789.—XEROGRAPHIC ROLLER OSCILLATING CLEANING BLADE WITH DRIVE MECHANISM THEREFOR. JUNE 26, 1973. BEL. 0789327, CAN. 0991250, FRA. 7233724, GER. 2243491, GRB. 1403440, ITL. 0967796, SWD. 7212455.

3,742,551.—TONER CLEANING AND STORAGE APPARATUS. JULY 3, 1973. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.

3,788,454.—CHAIN BEAD DRIVE APPARATUS. JAN. 29, 1974. GRB. 1430379.

3,795,025.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR CLEANING APPARATUS. MAR. 5, 1974.

3,807,853.—ELECTROPHOTOGRAPHIC CLEANING APPARATUS. APR. 30, 1974. GRB. 1439229.

4,032,228.—FOREIGN OBJECT DETECTOR BRUSH CLEANER. JUNE 28, 1977.

Class 9A 2B

3,404,418.—SHEET TRANSPORT APPARATUS. OCT. 8, 1968. CAN. 0859327.

3,572,923.—CLEANING METHOD AND APPARATUS FOR ELECTROSTATIC COPYING MACHINES. MAR. 30, 1971. ARG. 0172603, AUS. 0429490, BEL. 0737957, CAN. 0884822, FRA. 6929174, GRB. 1259890, ITL. 0870233, JAP. 0819708, MEX. 0113040, SPN. 0370878, SWD. 0348851.

3,655,373.—CLEANING METHOD FOR ELECTROSTATIC COPYING MACHINE. APR. 11, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,722,018.—CLEANING APPARATUS. MAR. 27, 1973.

3,738,745.—FUR BRUSH ERASER. JUNE 12, 1973. CAN. 0970554, GRB. 1418036.

4,123,154.—COMBINED CORONA GENERATOR AND IMAGING SURFACE CLEANER. OCT. 31, 1978.

Class 9A 2B 1

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

Class 9A 2C

3,252,274.—XEROGRAPHIC POWDER FILTER. MAY 24, 1966. CAN. 0712876, GER. 1278245, GRB. 1031634, JAP. 0502993.

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.

3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.

3,641,979.—TONER RECLAIMING SYSTEM. FEB. 15, 1972. CAN. 0913351.

3,793,986.—TONER RECLAIMING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. FEB. 26, 1974. ARG. 0194370, AUS. 0464194, BEL. 0784636, GER. 0978341, GRB. 1373721, ITL. 0956416, MEX. 0128265, SPN. 403.704, STZ. 0546970, VZL. 0033339.

3,816,157.—TONER RECLAIMING METHOD. JUNE 11, 1974.

4,046,682.—TONER RECLAIMING SYSTEM. SEPT. 6, 1977. CAN. 1030209.

Class 9B

3,332,328.—XEROGRAPHIC DEVELOPER SEAL AND PROCESS. JULY 25, 1967. CAN. 0792684, GRB. 1138394, JAP. 0512658, MEX. 0091318.

3,607,160.—LIGRCIN CONTAINING PUMICING COMPOSITION. SEPT. 21, 1971.

3,610,749.—IMAGING SYSTEM. OCT. 5, 1971. CAN. 0923541, GRB. 1339905, JAP. 0745767.

3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.

3,834,804.—COPYING MACHINE WITH MEANS FOR MOUNTING CARRIER BEAD PICKOFF ROLLER THEREIN. SEPT. 10, 1974.

4,026,701.—GAS IMPINGMENT & SUCTION CLEANING APPARATUS. MAY 31, 1977.

4,108,546.—CLEANING APPARATUS AND ELECTROSTATOGRAPHIC REPRODUCING MACHINE. AUG. 22, 1978.

4,121,947.—METHOD OF CLEANING A PHOTORECEPTOR. OCT. 24, 1978.

Class 9B 1

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

4,108,546.—CLEANING APPARATUS AND ELECTROSTATORAPHIC REPRODUCING MACHINE. AUG. 22, 1978.

4,116,555.—BACKGROUND REMOVAL APPARATUS. SEPT. 26, 1978.

4,127,327.—APPARATUSES INCORPORATING A COMPOSITE SUPPORT MEMBER. NOV. 28, 1978.

Class 9B 2

RE.28,566.—CLEANING APPARATUS. OCT. 7, 1975. CAN. 0913310, MEX. 0113698.

3,424,615.—METHOD AND APPARATUS FOR CLEANING XEROGRAPHIC PLATES. JAN. 28, 1969. CAN. 0842022, GRB. 1158521, JAP. 0561239.

3,580,673.—CLEANING APPARATUS-REISSUED AS RE28566-D2266R. MAY 25, 1971. CAN. 0913310, MEX. 0113698.

3,615,398.—METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING PHOTOCONDUCTV SRFACE. OCT. 26, 1971.

3,625,683.—PROCESS FOR CLEANING A PHOTO-CONDUCTIVE DRUM OF RESIDUAL TONER PARTICLES AND REUSE OF THE SAME. DEC. 7, 1971. CAN. 0937800, GRB. 1329982.

3,628,950.—METHOD OF REMOVING THE RESIDUAL TONER PARTICLES FROM A PHOTOCONDUCTIVE SURFACE. DEC. 21, 1971.

3,640,707.—IMAGING SYSTEM. FEB. 8, 1972.

3,655,375.—INTERMITTENT GRIT REMOVAL PROCESS. APR. 11, 1972. CAN. 0924493, GRB. 1341404, JAP. 0746926.

3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.

3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 9B 3

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

3,483,034.—PROCESS OF CLEANING XEROGRAPHIC PLATES. DEC. 9, 1969. CAN. 0800825, FRA. 1463257, GER. 1497235, GRB. 1125594, ITL. 0750154.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.

3,702,303.—CLEANING OF PHOTOCONDUCTIVE INSULATING SURFACES. NOV. 7, 1972. CAN. 0944650, GRB. 1369451.

3,762,950.—CLEANING OF PARTICLES FROM A SURFACE. OCT. 2, 1973. ARG. 0195076, AUS. 0464713, BEL. 7916681, CAN. 0974009, FRA. 7241538, GRB. 1400238, ITL. 0971072, MEX. 0128580, SPN. 0408837, STZ. 0553433, SWD. 7215089, VZL. 0032005.

3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.

3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

3,937,665.—PHOTORECEPTOR SOLVENT CLEANER. FEB. 10, 1976.

3,979,317.—VOLATILE CLEANING SOLUTION FOR PHOTORECEPTOR. SEPT. 7, 1976.

4,054,534.—VOLATILE CLEANING SOLUTION FOR MIRRORS AND LENSES. OCT. 18, 1977.

Class 10

3,945,728.—AN ALARM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 23, 1976.

4,089,515.—DOCUMENT STORAGE AND TRANSPORT APPARATUS. MAY 16, 1978. BEL. 850379.

4,109,903.—FLUIDIC FEEDING OF DOCUMENTS TO AN EXPOSURE STATION. AUG. 29, 1978.

Class 10A

RE29,406.—DOCUMENT ORIGINAL HANDLING SYSTEM. SEPT. 20, 1977. FRA. 7442405.

D.230,085.—COPY PAPER CASSETTE. JAN. 22, 1974.

3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.

3,152,528.—DOCUMENT CARRIER. OCT. 13, 1964. CAN. 0707048, FRA. 1414049, GER. 1197744, GRB. 1032954, ITL. 0737307, JAP. 0471310.

3,220,275.—DOCUMENT DRIVE TRANSMISSION. NOV. 30, 1965.

3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.

3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.

3,326,548.—CARD CONVEYING APPARATUS HAVING A ROTARY FRONT GAUGE. JUNE 20, 1967. CAN. 0793702, MEX. 0086197.

3,370,844.—CARD HANDLING-SCANNING DEVICE. FEB. 27, 1968.

3,409,356.—CONVEYOR FOR DOCUMENTS. NOV. 5, 1968. FRA. 1500227, GRB. 1162982, ITL. 0776597.

3,409,357.—APPARATUS FOR AN ELECTROSTATIC MACHINE. NOV. 5, 1968. CAN. 0816416, GRB. 1151104, JAP. 0542588.

3,419,264.—DOCUMENT HANDLING SYSTEM. DEC. 31, 1968. ARG. 0168399, CAN. 0831413, CHL. 0024536, JAM. 0002459, MEX. 0101167, PRU. 0009340, URG. 0009205, VZL. 0023735.

3,424,528.—DOCUMENT CONVEYOR UNIT. JAN. 28, 1969. CAN. 0842644, GRB. 1175596.

3,446,554.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 27, 1969. ARG. 0171943, ATR. 0302040, AUS. 0451715, BEL. 0708649, CAN. 0880187, FRA. 1567148, GRB. 1223426, HUN. 0158170, ITL. 0823019, JAP. 0657008, LXB. 0055166, MEX. 0101029, NOR. 0127833, PLD. 0069795, SPN. 0348801, STZ. 0485581, SWD. 0354529, USR. 0259733, VZL. 0023685.

3,504,908.—DOCUMENT FEEDING APPARATUS CONTROL. APR. 7, 1970.

3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.

3,578,316.—DRIVING APPARATUS FOR ARTICLE FEEDERS. MAY 11, 1971. CAN. 0907653.

3,614,090.—DOCUMENT CONVEYOR. OCT. 19, 1971. ARG. 0183554, AUS. 0451766, BEL. 0751308, CAN. 0922330, EGR. 0081784, FRA. 7019911, GRB. 1311766, ITL. 0893688, MEX. 0118182, SPN. 0380271, STZ. 0512751, SWD. 0362150, TIW. 0007678, USR. 0349152, VZL. 0032780.

3,628,408.—STAMP DISPENSER. DEC. 21, 1971. CAN. 0931918, GRB. 1324699, JAP. 0755787.

3,628,786.—DOCUMENT HANDLING APPARATUS. DEC. 21, 1971. CAN. 0942552, GRB. 1329989.

3,630,515.—DOCUMENT HANDLING APPARATUS. DEC. 28, 1971.

3,630,519.—DOCUMENT FEED APPARATUS. DEC. 28, 1971. CAN. 0903779, GRB. 1329747.

3,649,447.—APPARATUS FOR DECURLING A PAPER WEB. MAR. 14, 1972. CAN. 0916185, GRB. 1288846.

3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.

3,804,514.—DUAL FUNCTION DOCUMENT STOP FOR A COPYING DEVICE. APR. 16, 1974. FRA. 7334456, GRB. 1424060.

3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.

3,860,339.—COPYING MACHINE. JAN. 14, 1975.

3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.

3,874,651.—REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER. APR. 1, 1975. GRB. 1467791.

3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.

3,885,782.—SHEET FEEDER. MAY 27, 1975. CAN. 3885782.

3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,889,943.—PLATEN TRANSPORT FOR AUTOMATIC DOCUMENT HANDLER. JUNE 17, 1975.

3,900,258.—EXPOSURE APPARATUS. AUG. 19, 1975. AUS. 0474469, CAN. 1004724, GRB. 1424242, ITL. 0993030, SPN. 0418138, SWD. 7311579.

3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26. 1975.

3,909,129.—DOCUMENT FEEDING APPARATUS. SEPT. 30, 1975.

3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.

3,941,376.—AUTOMATIC DOCUMENT HANDLER-ARDRI ADH PLATEN TRANSPORT MOUNTING. MAR. 2, 1976. BEL. 0799234, CAN. 0993906, FRA. 7316540, GRB. 1421427, ITL. 0987317, SPN. 0414541.

3,941,473.—MANUAL ASSIST DOCUMENT FEEDER. MAR. 2, 1976.

3,944,365.—DOCUMENT FEEDING APPARATUS AND LATCHING MECHANISM. MAR. 16, 1976.

3,944,794.—COPYING SYSTEM CONTROL. MAR. 16, 1976. ARG. 0204710, BEL. 0808230, CAN. 1007289, FRA. 7343289, GRB. 1450707, ITL. 1002162, MEX. 0135679, SPN. 0421150, STZ. 0577391, USR. 0543364.

3,947,111.—DOCUMENT FEEDING APPARATUS. MAR. 30, 1976.

3,953,122.—DOCUMENT ORIGINAL HANDLING SYSTEM. APR. 27, 1976.

3,954,259.—DOUBLE BAR SEPARATOR FOR A SHEET RECEIVING TRAY. MAY 4, 1976.

3,959,573.—COMPOSITIONS AND METHODS FOR MAKING BIASABLE MEMBERS. MAY 25, 1976.

3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.

3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.

3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.

3,982,832.—ELECTROSTATOGRAPHIC COPYING MACHINES. SEPT. 28, 1976.

3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.

3,988,065.—REFLECTIVE DOCUMENT FEEDER. OCT. 26, 1976.

3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.

4,000,943.—DUAL PURPOSE DOCUMENT HANDLING SYSTEM. JAN. 4, 1977. BEL. 0837235.

4,004,941.—CLEANING METHOD FOR AUTOMATIC DOCUMENT HANDLER. JAN. 25, 1977.

4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.

4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.

4,017,172.—DOCUMENT FEEDING APPARATUS. APR. 12, 1977.

4,018,523.—REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT. APR. 19, 1977. BEL. 0842928.

4,030,721.—AUTOMATIC MANUSCRIPT DISCHARGING DEVICE FOR COPYING MACHINES. JUNE 21, 1977.

4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.

4,034,869.—FLUID MEANS TO LOAD AND UNLOAD A VERTICALLY MOVABLE DOCUMENT STORAGE RACK. JULY 12, 1977.

4,040,615.—ORIGINAL DISCHARGING DEVICE FOR COPIERS. AUG. 9, 1977.

4,043,550.—IMPROVED REGISTRATION MEANS FOR AUTOMATIC DOCUMENT HANDLING APPARATUS. AUG. 23, 1977. BEL. 847626, FRA. 7631994, SPN. 452660.
4,043,664.—INTERLINEAR FEEDER FOR COPYING MACHINE. AUG. 23, 1977.
4,043,665.—COPIER DOCUMENT HANDLER. AUG. 23, 1977.
4,047,812.—DOCUMENT BELT WITH .MPERFORATE BANDS. SEPT. 13, 1977. GER. 7700998.
4,049,255.—APPARATUS FOR FEEDING DOCUMENTS TO AND FROM A COPIER. SEPT. 20, 1977. FRA. 7706823.
4,050,751.—DOCUMENT CAROUSEL. SEPT. 27, 1977.
4,050,816.—DOCUMENT HANDLING SYSTEM. SEPT. 27, 1977. BEL. 839792, SPN. 445641.
4,053,224.—DOCUMENT HANDLING SYSTEM. OCT. 11, 1977.
4,059,260.—DOCUMENT HANDLING APPARATUS. NOV. 22, 1977.
4,062,538.—SPEED REGULATED FLUIDIC SHEET TRANSPORT. DEC. 13, 1977. BEL. 850380.
4,078,786.—AUTOMATIC DOCUMENT RECIRCULATION SYSTEM. MAR. 14, 1978.
4,079,876.—COMPUTER FORMS FEEDER. MAR. 21, 1978.
4,080,063.—COPIER DOCUMENT HANDLING SYSTEM. MAR. 21, 1978.
4,086,007.—DUAL PURPOSE DOCUMENT AND COPY SHEET FEED CASSETTE. APR. 25, 1978.
4,087,172.—DOCUMENT HANDLING APPARATUS. MAY 2, 1978.
4,093,372.—PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM. JUNE 6, 1978.
4,097,146.—ORIGINAL HANDLING SYSTEM AND PROCESS. JUNE 27, 1978. .
4,099,810.—UPRIGHT DOCUMENT CAROUSEL. JULY 11, 1978.
4,108,547.—DOCUMENT LOADING FOR COPYING. AUG. 22, 1978. BEL. 839792. GRB. 1524101. SPN. 445641.
4,110,028.—DRIVE SYSTEM FOR MULTI-MODE REPRODUCING APPARATUS. AUG. 29, 1978. BEL. 844828.
4,126,817.—SERVO SYSTEM FOR MAINTAINING CONSTANT TENSION ON A WEB. NOV. 21, 1978.
4,132,401.—COPIER DOCUMENT SENSING AND CONTROL SYSTEM. JAN. 2, 1979. GRB. 1523900. USR. 604211.
4,145,041.—AUTOMATIC DOCUMENT HANDLING APPARATUS. MAR. 20, 1979.
4,146,220.—DOCUMENT HANDLING APPARATUS. MAR. 27, 1979.
4,146,326.—DOCUMENT HANDLING APPARATUS AND REPRODUCING MACHINE. MAR. 27, 1979.
4,159,824.—METHOD FOR REVERSING THE DIRECTION OF TRAVEL OF A SHEET. JULY 3, 1979.
4,160,547.—DOCUMENT HANDLING APPARATUS. JULY 10, 1979.

Class 10B

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,139,279.—RECORD CARD MAGAZINE. JUNE 30, 1964. CAN. 0717868.
3,180,637.—RECORD CARD FEEDING APPARATUS. APR. 27, 1965. CAN. 0806932.
3,357,574.—SEQUENTIAL CONTROL SYSTEM. DEC. 12, 1967. CAN. 0824898.
3,383,105.—CARD PICK-OFF APPARATUS. MAY 14, 1968. CAN. 0820743, GRB. 1193512, JAP. 0610154.
3,482,917.—CARD TRANSPORT APPARATUS. DEC. 9, 1969. CAN. 0842646, GRB. 1193516.
3,784,303.—AUTOMATIC MICROFICHE COPIER. JAN. 8, 1974. CAN. 1000779, GRB. 1412221.
4,095,732.—METHOD AND APPARATUS FOR ACCURATELY CONTROLLING THE POSITION OF A FILM TRANSPORT DEVICE. JUNE 20, 1978.

Class 10C

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,506,257.—DOCUMENT FEEDING APPARATUS. APR. 14, 1970. CAN. 0885333, GRB. 1253416.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,861,671.—LIFTABLE BAIL BAR FOR ALLOWING RETURN OF MULTIPLY SEPARATED SHEETS TO STACK. JAN. 21, 1975.
3,895,790.—MOVABLE BAIL BAR. JULY 22, 1975. BEL. 0815050, CAN. 1009267.
3,936,180.—XEROGRAPHIC APPARATUS WITH SAMPLE PRINT CAPABILITIES. FEB. 3, 1976. BEL. 0809398, ITL. 1006708.
3,968,364.—HEIGHT SENSING DEVICE. JULY 6, 1976.
3,993,300.—AUTOMATIC FEEDER FOR COMPOSITE COPYING. NOV. 23, 1976. BEL. 0815215, GRB. 1467996, STZ. 0561917.
4,025,068.—SHEET FEEDER. MAY 24, 1977.
4,054,284.—PAPER-ANTI-SKEW DEVICE. OCT. 18, 1977.

Class 10D

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,581,000.—INCREMENTAL STEPPING PAPER DRIVE. MAY 25, 1971.
3,618,123.—FACSIMILE DRUM CONVEYOR. NOV. 2, 1971. ARG. 0181314, BEL. 0743659, CAN. 0918186, FRA. 6944287, GER. 1963786, GRB. 1280340, ITL. 0880304, JAP. 0852728, MEX. 0122967, SPN. 0374915, SWD. 0363457, VZL. 0025438.
3,790,159.—AUTOMATIC DOCUMENT HANDLING DEVICE. FEB. 5, 1974. CAN. 1013377, GRB. 1417793.
3,815,899.—SHEET DELIVERY DEVICE. JUNE 11, 1974. CAN. 0994377, FRA. 7409303, GRB. 1456422.
3,854,715.—CAM. DEC. 17, 1974. CAN. 1007256, GRB. 1456576.

Class 10E

3,288,459.—DOCUMENT FEEDING APPARATUS. NOV. 29, 1966. CAN. 0788345, JAP. 0632541, MEX. 0086958.
3,300,208.—COPY POSITIONING APPARATUS AND METHOD. JAN. 24, 1967. CAN. 0817270, JAP. 0605646, MEX. 0090842.
3,473,035.—DOCUMENT TRANSPORT AND REGISTRATION SYS USING PHOTOCELLS. OCT. 14, 1969. ARG. 0170131, CAN. 0858983, CHL. 0024005, JAM. 0001926, MEX. 0101674, PRU. 0009301, URG. 0009238, VZL. 0023677.
3,510,125.—DOCUMENT REGISTRATION SYSTEM. MAY 5, 1970. BEL. 0726865, CAN. 0897195, FRA. 2000318, GER. 1902112, GRB. 1253417, ITL. 0854755, JAP. 0783473.
3,558,223.—DOCUMENT CENTERING APPARATUS. JAN. 26, 1971.
3,630,611.—DOCUMENT REGISTRATION APPARATUS. DEC. 28, 1971.
3,630,620.—PLATEN COVER FOR COPYING MACHINES. DEC. 28, 1971. CAN. 0921307, GRB. 1309313.
3,642,370.—DOCUMENT PRESENTATION DEVICE. FEB. 15, 1972. GRB. 1206633.
3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.
3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973.
3,829,082.—AUTOMATIC DOCUMENT HANDLER. AUG. 13, 1974. CAN. 0986958, GRB. 1421425.
3,854,715.—CAM. DEC. 17, 1974, CAN. 1007256, GRB. 1456576.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975. CAN. 1004240.
3,877,804.—CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER. APR. 15, 1975.
3,883,134.—DETECTING AND REMOVING APPARATUS FOR SKEW FED SHEETS. MAY 13, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,990,794.—COPYING MACHINE. NOV. 9, 1976. STZ. 05.P 7508.
4,026,542.—DUAL REGISTRATION APPARATUS. MAY 31, 1977.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,574.—DOCUMENT HANDLING APPARATUS. JULY 5, 1977.

4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.
4,043,550.—IMPROVED REGISTRATION MEANS FOR AUTOMATIC DOCUMENT HANDLING APPARATUS. AUG. 23, 1977. BEL. 847626, FRA. 7631994, SPN. 452660.
4,043,665.—COPIER DOCUMENT HANDLER. AUG. 23, 1977.
4,047,812.—DOCUMENT BELT WITH IMPERFORATE BANDS. SEPT. 13, 1977. GER. 7700998.
4,050,688.—ORTHOGONAL DOCUMENT HANDLING APPARATUS. SEPT. 27, 1977.
4,054,285.—APPARATUS FOR REGISTERING AND INVERTING SHEETS. OCT. 18, 1977.
4,055,340.—ASSISTED PNEUMATIC TRANSPORT AND REGISTRATION APPARATUS. OCT. 25, 1977. BEL. 848823.
4,062,538.—SPEED REGULATED FLUIDIC SHEET TRANSPORT. DEC. 13, 1977. BEL. 850380.
4,066,254.—THREE-WAY PNEUMATIC REGISTRATION APPARATUS. JAN. 3, 1978.
4,073,001.—APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET. FEB. 7, 1978.
4,076,233.—DOCUMENT HANDLING APPARATUS. FEB. 28, 1978. BEL. 847625, FRA. 7631999, SPN. 452661.
4,090,704.—REGISTRATION STATION. MAY 23, 1978.
4,097,146.—ORIGINAL HANDLING SYSTEM AND PROCESS. JUNE 27, 1978.
4,116,431.—METHOD FOR TRANSPORTING AND REGISTERING STACKED SHEETS. SEPT. 26, 1978.
4,124,205.—DOCUMENT HANDLING. NOV. 7, 1978.
4,130,274.—PNEUMATIC REGISTRATION APPARATUS. DEC. 19, 1978. BEL. 847912. SAF. 6401.
4,143,960.—RETRACTABLE SUPPORT MEMBER. MAR. 13, 1979.
4,146,219.—DOCUMENT TRANSPORT APPARATUS. MAR. 27, 1979. GRB. 1529698. SPN. 452659.

Class 10F

3,288,464.—CARD INVERTING APPARATUS. NOV. 29, 1966. CAN. 0803316, JAP. 0547200.
3,408,140.—DOCUMENT HANDLING APPARATUS. OCT. 29, 1968. CAN. 0842643, GRB. 1143062.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246, GRB. 1445854.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
3,980,406.—DUPLEX IMAGING SYSTEM. SEPT. 14, 1976.
4,040,616.—SHEET TURN AROUND INVERTER. AUG. 9, 1977. FRA. 7701111.
4,054,285.—APPARATUS FOR REGISTERING AND INVERTING SHEETS. OCT. 18, 1977.
4,089,515.—DOCUMENT STORAGE AND TRANSPORT APPARATUS. MAY 16, 1978. BEL. 850379.
4,111,547.—DUPLEX DOCUMENT COPYING. SEPT. 5, 1978.

Class 10G

3,419,265.—DOCUMENT STACKER APPARATUS. DEC. 31, 1968. ARG. 0171423, CAN. 0833415, CHL. 0024006, JAM. 0001859, MEX. 0100967, PRU. 0001930, URG. 0009140, VZL. 0023736.
3,460,825.—FAN FOLD STACKING APPARATUS. AUG. 12, 1969. CAN. 0855586, GRB. 1205418.
3,497,207.—SORTING APPARATUS FOR DOCUMENTS. FEB. 24, 1970. BEL. 0727203, CAN. 0895731, FRA. 6900957, GRB. 1245841, HOL. 0148006, ITL. 0854588.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,729,188.—DOCUMENT STACKER APPARATUS. APR. 24, 1973. CAN. 1000311, FRA. 0701711, GRB. 1303165, ITL. 0893040.
3,805,480.—ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING. FEB. 11, 1975.
4,017,066.—SET SEPARATOR. APR. 12, 1977.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,093,372.—PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM. JUNE 6, 1978.
4,132,400.—APPARATUS FOR ALIGNING A STACK OF SHEETS. JAN. 2, 1979.

Class 10H

3,467,371.—SHEET DISTRIBUTOR. SEPT. 16, 1969. ARG. 0168293, ATR. 0294140, AUS. 0423257, BEL. 0702898, CAN. 0925803, CHL. 0023102, CLB. 0017542, DNK. 0124250, EIR. 0031306, FIN. 0047869, FRA. 1541084, GRB. 1193513, GRK. 0038675, IND. 0112000, ISR. 0028519, ITL. 0813836, JAP. 0645588, LXB. 0054335, MEX. 0099952, NOR. 0124920, NZL. 0149788, PAK. 0118964, PLP. 0006507, PRU. 0009477, PTG. 0048210, SAF. 0674986, SPN. 0344349, STZ. 0480253, SWD. 0337384, TRK. 0015492, URG. 0008974, VZL. 0026276.
3,815,896.—AUTOMATIC DOCUMENT HANDLER. JUNE 11, 1974. BEL. 0797889, CAN. 0984863, FRA. 7316287, GRB. 1421426, ITL. 0987316, SPN. 0414486.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,907,277.—METHOD AND DEVICE FOR REMOVING DOCUMENTS FROM A PLATEN. SEPT. 23, 1975.
3,913,467.—COLLATING APPARATUS. OCT. 21, 1975.
3,944,207.—LIMITLESS SORTER. MAR. 16, 1976.
3,944,366.—SLIDING PLATEN COVER APPARATUS. MAR. 16, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976. BEL. 0839792, SPN. 0445641.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.
4,050,816.—DOCUMENT HANDLING SYSTEM. SEPT. 27, 1977. BEL. 839792, SPN. 445641.
4,108,547.—DOCUMENT LOADING FOR COPYING. AUG. 22, 1978. BEL. 839792. GRB. 1524101. SPN. 445641.
4,120,580.—COLLATING SYSTEM FOR SLIDE REPRODUCTION. OCT. 17, 1978.

Class 10r

3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,609,737.—METHOD AND APPARATUS FOR ARTICLE DETECTION UTILIZING CORONA DISCHARG. SEPT. 28, 1971. CAN. 0872468, GER. 1932248, GRB. 1259998, JAP. 0657911.
3,672,760.—XEROGRAPHIC PLATE TRANSPORTING MECHANISM. JUNE 27, 1972. CAN. 0939555, GRB. 1359888.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
3,744,047.—SUPERPOSED SHEET DETECTION. JULY 3, 1973. CAN. 0985762, FRA. 7231694, GRB. 1396560, ITL. 0967501.
3,748,088.—FUSER CONTROL APPARATUS. JULY 24, 1973.
3,778,618.—PHOTODETECTION OF NON-OPAQUE OBJECTS TRANSPRTD ALONG A CONVEYOR BY USE OF A LIGHT BLCKING OPAQU. DEC. 11, 1973. GRB. 1406170.
3,790,158.—AUTOMATIC DOCUMENT HANDLER. FEB. 5, 1974. GRB. 1421428.
3,894,513.—COPYING MACHINE WITH BEAD PICKOFF ROLLER. JULY 15, 1975. FRA. 7342586, GRB. 1441288.
3,945,546.—ZIG ZAG FOLDED STRIP BOTTOM FEEDER. MAR. 23, 1976.
4,116,431.—METHOD FOR TRANSPORTING AND REGISTERING STACKED SHEETS. SEPT. 26, 1978.
4,132,401.—COPIER DOCUMENT SENSING AND CONTROL SYSTEM. JAN. 2, 1979. GRB. 1523900. USR. 604211.

Class 12

4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 12A

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.

3,384,565.—PROCESS OF PHOTOELECTROPHORETIC COLOR IMAGING. MAY 21, 1968. ARG. 0149921, ATR. 0304268, AUS. 0414156, BEL. 0667116, BRA. 0087920, CAN. 0867678, CHL. 0021697, CLB. 0014706, FRA. 1450843, GER. 1497243, GRB. 1124626, GRK. 0030605, IND. 0119647, ISR. 0023973, ITL. 0744030, JAP. 681941, LXB. 0049058, MEX. 0091899, NOR. 0128733, NZL. 0142323, PPU. 0009538, PTG. 0044324, SAF. 653922, SPN. 0321858, STZ. 0481409, SWD. 6509579, URG. 0009540. VZL. 0017273.

3,384,566.—METHOD OF PHOTOELECTROPHORETIC IMAGING. MAY 21, 1968.

3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973. CAN. 1003025.

3,759,611.—MICROIMAGE RANSOM ACCESS AND RETRIEVAL PRINTER. SEPT. 18, 1973. CAN. 0987156, GRB. 1427017.

Class 12B

3,383,993.—PHOTOELECTROPHORETIC IMAGING APPARATUS. MAY 21, 1968. ARG. 0165160, AUS. 0419734, BEL. 0692048, CAN. 0866143, FRA. 1507051, GRB. 1158301, GRK. 0033285, HOL. 0150926, ITL. 0862555, LXB. 0052738, MEX. 0096357, PTG. 0044324, SAF. 0067022, SPN. 0335121, STZ. 0510901, VZL. 0024450.

3,610,748.—PHOTOELECTROPHORETIC IMAGING SYSTEM. OCT. 5, 1971. BEL. 0752438, CAN. 0922569, FRA. 7023045, GRB. 1319532, ITL. 0894621, JAP. 0739527.

3,656,847.—ELEVATOR MECHANISM. APR. 18, 1972.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,697,409.—BELT ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. ARG. 0183572, BEL. 0760077, BRA. 7023343, CAN. 0937803, FRA. 7045072, GRB. 1339734, ITL. 0913368, JAP. 0752721, MEX. 0119368, VZL. 0032930.

3,844,779.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A BELT ELECTRODE. OCT. 29, 1974.

4,043,654.—DISPLAY SYSTEM. AUG. 23, 1977.

4,043,655.—PHOTOELECTROPHORETIC IMAGING REPRO- DUCTION DEVICE. AUG. 23, 1977.

Class 12C

3,427,242.—APPARATUS FOR CONTINUOUS PHOTOELECTROPHORETIC IMAGING. FEB. 11, 1969. BEL. 0743902, CAN. 0851701, FRA. 1521727, GER. 1572385, GRB. 1185932, ITL. 0794269, JAP. 0580245, MEX. 0097005.

3,474,019.—PHOTOELECTROPHORETIC IMAGING MTD INC. CONTACTNG IMGNG SUSPNSN W/ ALG SFC OF FLEXIBLE ELECTRODE. OCT. 21, 1969. AUS. 0418224, BEL. 0692912, BRA. 6678842, CAN. 0834679, GRK. 0033301, LXB. 0052730, MEX. 0090286, PTG. 0046984, SAF. 0670024, SPN. 0335454.

3,551,320.—IMAGING APPARATUS. DEC. 29, 1970.

3,600,081.—IMAGING APPARATUS. AUG. 17, 1971. ARG. 0192211, ATR. 0324839, AUS. 0455820, BEL. 0758903, CAN. 0936732, CZC. 0164288, EGR. 0090482. FRA. 7041652, GRB. 1335990, ITL. 0909307, JAP. 0751878, MEX. 0122272, PNM. 0002094, SPN. 0385453, STZ. 0518582, SWD. 0362717, TIW. 0008461, USR. 0412697, VZL. 0032926.

3,609,028.—IMAGING APPARATUS. SEPT. 28, 1971. ARG. 0186570, ATR. 0319749, AUS. 0455572, BEL. 0758806, CAN. 0935012, EGR. 0086977, FRA. 7041648, GRB. 1335988, ITL. 0909306, MEX. 0121331, PLD. 0082852, PNM. 0002167, SPN. 0385452, STZ. 0518580, SWD. 0361753, TIW. 0007385, USR. 0465806, VZL. 30683.

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.

3,642,365.—AUTOMATED IMAGING MACHINE. FEB. 15, 1972. ARG. 0183571, ATR. 0324123, AUS. 0456428, BEL. 0758902, CAN. 0937440, EGR. 0091986, FRA. 7041647, GRB. 1337145, ITL. 0909311, JAP. 0758463, MEX. 0120289, PLD. 0082861, PNM. 0002255, SPN. 0385457. STZ. 0544327, SWD. 0367493, TIW. 0007386.

3,642,606.—APPARATUS FOR IMAGE FORMATION ON THE INSIDE OF A CYLINDER. FEB. 15, 1972. ARG. 0183573, BEL. 0760749, BRA. 7022094, CAN. 0938490, FRA. 7047632, GRB. 1339578, ITL. 0913902, JAP. 0752722, MEX. 0119589, VZL. 0032929.

3,644,035.—FLAT PLATE TRAVELING ROLLER IMAGING. FEB. 22, 1972. ARG. 0183670, AUS. 0456429, BEL. 0758904, BRA. 7023406, CAN. 0923356, EGR. 0090280, FRA. 7041653, GRB. 1335051, ITL. 0909308, JAP. 0751879, MEX. 0119530, PLD. 0082860, SPN. 0385454, STZ. 0528763, SWD. 0367074, TIW. 0008460, USR. 0404290, VZL. 30682.

3,645 616.—PHOTOELECTROPHORETIC IMAGE TRANSFER APPARATUS. FEB. 29, 1972. CAN. 0949049, GRB. 1337417, JAP. 783768.

3,647,290.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 7, 1972. ARG. 0184762, AUS. 0454820, BEL. 0058902, CAN. 0939954, EGR. 0090483, FRA. 7061651, GER. 1337416, GRB. 1337416, ITL. 0909312, JAP. 0751880, MEX. 0119752, SPN. 0385458, STZ. 0530662, SWD. 0366850, TIW. 0007384, USR. 0419062, VZL. 30685.

3,667,842.—IMAGING APPARATUS. JUNE 6, 1972. ARG. 0193347, BEL. 0768538, CAN. 0953559, FRA. 7122750, GRB. 1350395, ITL. 0927384, MEX. 0123298.

3,703,335.—MULTIPLE EXPOSURE IMAGING APPARATUS. NOV. 21, 1972. BEL. 0760457, CAN. 0968605, FRA. 7047141, GRB. 1339550, ITL. 0913636, JAP. 0759479.

3,719,484.—PHOTOELECTROPHORETIC IMAGING METHOD. MAR. 6, 1973. CAN. 0957890, GRB. 1369701.

3,728,018.—IMAGING APPARATUS. APR. 17, 1973. CAN. 0924156, GRB. 1335697.

3,800,743.—MATERIALS APPLICATION APPARATUS. APR. 2, 1974.

3,860,336.—PHOTOELECTROPHORETIC IMAGING MACHINE AND APPTS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACT. JAN. 14, 1975.

3,860,337.—MULTIPLE EXPOSURE METHOD AND APPARATUS. JAN. 14, 1975. CAN. 0957890, GRB. 1369701.

3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.

4,006,982.—PHOTOELECTROPHORETIC CONCURRENT PROCESS CYCLING. FEB. 8, 1977. BEL. 0841077.

4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.

4,066,452.—VELOCITY COMPENSATION FOR BEAD BYPASS. JAN. 3, 1978.

4,084,896.—PHOTOELECTROPHORETIC WEB IMAGING APPARATUS. APR. 18, 1978. BEL. 841077, FRA. 7612178.

Class 12D

3,448,025.—PHOTOELECTROPHORETIC IMAGING SYSTEM UTILIZING A PROGRAMMED POTENTIAL APPLICATION. JUNE 3, 1969. ARG. 0167580, AUS. 0417981. BEL. 0719188, CAN. 0875492, FRA. 0095530, GER. 1797123, GRB. 1149666, ITL. 0890086, MEX. 0100805, VZL. 0025946.

3,485,738.—PHOTOELECTROPHORETIC IMG PROCESS EMPLOYNG LAYER OF INSULATNG LIQUID TO IMPROVE IMAGE QUALITY. DEC. 23, 1969. AUS. 0431891, BEL. 0743640, CAN. 0850591, GER. 1522751, GRB. 1174831, JAP. 0578397.

3,565,614.—IMAGE TRANSFER. FEB. 23, 1971. ARG. 0157773, AUS. 0413930, BEL. 0696853, CAN. 0890362, FRA. 1520919, GER. 1572384, GRB. 1185931, ITL. 0801198, JAP. 0586922, MEX. 0099070, SPN. 0349966, STZ. 0482230, SWD. 0332754, VZL. 0024013.

3,582,205.—IMAGING APPARATUS. JUNE 1, 1971.

3,616,398.—PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE. OCT. 26, 1971.

3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.

3,697,407.—PREVENTION OF ARCING IN AN ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. CAN. 0884225, GRB. 1309127, JAP. 0731608.

3,697,408.—IMAGING SYSTEM. OCT. 10, 1972. CAN. 0890361, GRB. 1312733, JAP. 0731610.

3,708,286.—PHOTOELECTROPHORETIC IMAGING WITH ULTRASONIC VIBRATION DURING IMAGING. JAN. 2, 1973. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,853,556.—METHOD FOR ELIMINATING ELECTRICAL ARCING DURING PHOTOELECTROPHORETIC IMAGING. DEC. 10, 1974.

Class 12E

3,535,221.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING A PHOTOCONDUCTOR COAT-

ING FOR THE BLOCKING ELECTRO. OCT. 20, 1970. ARG. 0176485, AUS. 0448560, BEL. 0722301, CAN. 0891971, FRA. 1587938, GER. 1802988, GRB. 1236619, ITL. 0845022, JAP. 0693378, MEX. 0108364, VZL. 0023742.

3,595,771.—METHOD OF REMOVING ACCUMULATED CHARGES IN PHOTOELECTROPHORETIC IMAGING. JULY 27. 1971. ARG. 0198476, ATR. 0302041, AUS. 0448837, BEL. 0737549, CAN. 0922955, FRA. 6927969, GER. 1941463, GRB. 1267255, ITL. 0869935, JAP. 0704156, SWD. 0341726.

3,639,224.—PHOTOELECTROPHORETIC IMAGING SYSTEM. FEB. 1, 1972. CAN. 0922568, GRB. 1313683, JAP. 0739526.

3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,775,107.—IMAGING SYSTEM. NOV. 27, 1973.

3,859,576.—HIGH PERFORMANCE BLOCKING ELECTRODE FOR ELECTROPHOTOPHORESIS. JAN. 7, 1975. BEL. 0810802, ITL. 1006354.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

3,956,524.—METHOD FOR THE PREPARATION OF ELECTROSTATOGRAPHIC AND PHOTORECEPTORS. MAY 11, 1976.

3,966,466.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DARK CHARGE INJECTING AGENT ON BLOCKING ELECTRODE. JUNE 29, 1976.

3,967,961.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A DARK CHARGE INJECTING AGENT-AKLYD RESIN COATING. JULY 6, 1976.

3,980,477.—PHOTOELECTROPHORESIS WITH DARK CHARGE INJECTING ELEMENT. SEPT. 14, 1976.

Class 12F

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.

3,702,289.—PHOTOELECTROPHORETIC PROC-ESS AND APPARATUS. NOV. 7, 1972. CAN. 0958579, GRB. 1359695.

3,705,766.—PHOTOELECTROPHORETIC APPARATUS. DEC. 12, 1972. CAN. 0955100, GRB. 1359862.

Class 12G

3,655,550.—ELECTROSTATIC PIGMENT FILTER. APR. 11, 1972.

3,656,200.—CLEANING APPARATUS. APR. 18, 1972.

3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.

3,659,302.—CLEANING APPARATUS. MAY 2, 1972.

3,673,632.—CLEANING APPARATUS. JULY 4, 1972.

3,686,035.—CLEANING APPARATUS. AUG. 22, 1972. CAN. 0925660, GRB. 1335989.

3,821,027.—METHOD OF CLEANING ACCUMULATED MATERIAL FROM A SLOT. JUNE 28, 1974.

3,919,737.—CLEANING APPARATUS. NOV. 18, 1975.

3,945,724.—VELOCITY COMPOSITION FOR BEAD BYPASS. MAR. 23, 1976.

3,950,088.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. APR. 13, 1976.

3,986,772.—BEAD BYPASS. OCT. 19, 1976.

3,988,060.—BEAD BYPASS SPEED REDUCTION. OCT. 26, 1976.

3,989,365.—MOTION COMPENSATION FOR BEAD BYPASS. NOV. 2, 1976.

4,066,452.—VELOCITY COMPENSATION FOR BEAD BYPASS. JAN. 3, 1978.

Class 12H

3,505,131.—PROCESS FOR THE PREPARATION OF A CUPROUS IODIDE CONDUCTIVE FILM. APR. 7, 1970. CAN. 0876074, GER. 1800653, GRB. 1244012, JAP. 0615874.

3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.

3,623,805.—DRIVE MECHANISM FOR IMAGING APPARATUS. NOV. 30, 1971.

3,628,859.—IMAGING MACHINE IMPROVEMENT. DEC. 21, 1971. BEL. 0760455, CAN. 0937436, FRA. 7047139, GRB. 1339549, ITL. 0913635, JAP. 0764505.

3,630,615.—METHOD AND APPARATUS FOR TRANSPORTING SUPPORT MATERIAL. DEC. 28, 1971.

3,630,884.—TRANSPARENT ELECTRODE IMAGING IMPROVEMENT. DEC. 28, 1971. CAN. 0890359, GRB. 1313696, JAP. 0739525.

3,639,049.—COPY SYSTEM. FEB. 1, 1972.

3,640,616.—OPAQUE ILLUMINATION AND SCANNING SYSTEM. FEB. 8, 1972. CAN. 0926674, GRB. 1337418, JAP. 0731615.

3,647,294.—MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS. MAR. 7, 1972. CAN. 0913355, GRB. 1337146, JAP. 0759478.

3,654,654.—CLEANING APPARATUS. APR. 11, 1972. CAN. 0925257, GRB. 1335850, JAP. 0791054.

3,673,632.—CLEANING APPARATUS. JULY 4, 1972.

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.

3,685,897.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. AUG. 22, 1972. CAN. 0957542.

3,687,109.—MATERIALS APPLICATION APPARATUS. AUG. 29, 1972. CAN. 0915907, GRB. 1337148.

3,697,167.—OPTICAL PROJECTION APPARATUS. OCT. 10, 1972. BEL. 0772913, CAN. 0955090. FRA. 7134731, GRB. 1316023, ITL. 0936735.

3,703,459.—LIQUID APPLICATOR. NOV. 21, 1972.

3,718,393.—IMAGING APPARATUS. FEB. 27, 1973.

3,722,993.—MATERIALS APPLICATION APPARATUS. MAR. 27, 1973.

3,730,620.—FOCUSING ME THOD. MAY 1, 1973.

3,737,221.—ROTATIONAL DRIVE MECHANISM. JUNE 5, 1973.

3,744,897.—TRANSPARENT ELECTRODE FOR ELECTROPHORETIC IMAGING. JULY 10, 1973.

3,769,850.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. NOV. 6, 1973.

3,776,628.—PHOTOELECTROPHORETIC IMAGING SYSTEM. DEC. 4, 1973.

3,784,294.—IMAGE DENSITY CONTROL. JAN. 8, 1974.

3,840,299.—PHOTOELECTROPHORETIC IMAGING APP FOR VARYING ADVANCING RATE OF VELOCITY OF ROLLER ELECTRODES. OCT. 8, 1974.

3,844,651.—PHOTELCTRPHRTC IMG APP FOR CONTRLNG TIME INTRVL OF SUCSSV ROLLR ELCTRDS LEAVNG AND ENTERNG IMG RE. OCT. 29, 1974.

3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.

3,950,640.—LAMP CONTROL AND LAMP SWITCH CIRCUIT FOR CONTROLLING LIGHT BALANCE. APR. 13, 1976.

3,952,700.—LIQUID APPLICATOR. APR. 27, 1976.

3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,957,510.—OVERFLOW PREVENTION FOR LIQUID BETWEEN FLEXIBLE LAYERS ON A SOLID SURFACE. MAY 18, 1976.

3,981,459.—PHOTOELECTROPHORETIC ELECTROSTATIC TACKING CAPSTAN WEB TENSION SYS. SEPT. 21, 1976.

3,982,710.—PHOTOELECTROPHORETIC WEB TENSION SYSTEM. SEPT. 28, 1976.

3,985,434.—PHOTOELECTROPHORETIC PIGMENT DISCHARGING WITH AC COROTRON OR UV ILLUMINATION. OCT. 12, 1976.

3,989,366.—PHOTOELECTROPHORETIC IMAGING APPARATUS HAVING A DEVICE FOR INCREASING THE FRICTION FORCE BETWEE. NOV. 2, 1976. BEL. 0841080.

3,989,367.—APPARATUS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACTED. NOV. 2, 1976.

3,991,992.—PHOTOELECTROPHORETIC WEB MACHINE SERVO DRIVE SYSTEM. NOV. 16, 1976. BEL. 0841079.

4,049,343.—COMBINATION IMAGING AND GROUNDING ROLLER. SEPT. 20, 1977. BEL. 841076, FRA. 7612176.

4,059,443.—ELECTRICAL INFORMATION STORAGE SYSTEM. NOV. 22, 1977.

4,073,583.—PHOTOELECTROPHORETIC HEAT & PRESSURE TRANSFER MECHANISMS. FEB. 14, 1978. BEL. 841078, FRA. 7612171.

4,084,896.—PHOTOELECTROPHORETIC WEB IMAGING APPARATUS. APR. 18, 1978. BEL. 841077, FRA. 7612178.

Class 12I

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.

3,820,987.—PHOTOELECTROPHORETIC IMAGING WITH FIXING ON A SEPARATE ELECTRODE. JUNE 28, 1974.

Class 12J

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.

3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

4,065,304.—METHOD FOR FIXING INK IMAGES. DEC. 27, 1977. BEL. 848487.

Class 12K

3,510,419.—PHOTOELECTROPHORETIC IMAGING METHOD. MAY 5, 1970. ARG. 0165519, AUS. 0425666, BEL. 0717829. CAN. 0876044, FRA. 0095234, GRB. 1242262, ITL. 0896927, JAP. 0657876, MEX. 0102064, PNM. 0001975, PRU. 0010174, VZL. 0023693.

3,561,864.—ELECTROPHORETIC COATING DEVICE. FEB. 9, 1971. ARG. 0174608, ATR. 0302815, AUS. 0447649, BEL. 0739544, CAN. 0890357, FRA. 6933095, GER. 1949861, GRB. 1277806, ITL. 0873705, JAP. 0686763, MEX. 0113013.

3,609,029.—MATERIALS APPLICATION APPARATUS. SEPT. 28, 1971. BEL. 0772565, CAN. 0953097, FRA. 7133987, GRB. 1366382, ITL. 0936510.

3,619,053.—PHOTOELECTROPHORETIC IMAGING SYSTEM. NOV. 9, 1971. GRB. 1324102, JAP. 0759477.

3,620,948.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING PRELIMINARY ELECTROPHRIC DSPSTN OF IMAGNG SUSPENS. NOV. 16, 1971. ATR. 0326480, AUS. 0447819, BEL. 0739754, CAN. 0899137, FRA. 6933734, GRB. 1280027, HOL. 0146951, ITL. 0877872, JAP. 0709041, MEX. 0114889, SPN. 0372065, STZ. 0508232, SWD. 0341929, VZL. 0015070.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 09[illegible]434, JAP. 0743836.

3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.

3,744,896.—IMAGING SYSTEM. JULY 10, 1973.

3,769,009.—INKING SYSTEM FOR LIQUID PARTICLE MIGRATION ON AUTOMATIC MACHINE. OCT. 30, 1973. HOL. 7216013.

3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.

3,968,271.—COATING APPARATUS AND USE THEREOF. JULY 6, 1976.

3,993,020.—BLADE APPLICATOR ASSEMBLY. NOV. 23, 1976.

4,019,816.—COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE. APR. 26, 1977.

Class 12L

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.

3,649,515.—PHOTOGRAPHIC MASKING SYSTEM. MAR. 14, 1972. CAN. 0936733, GRB. 1349610, JAP. 0774711.

3,715,209.—ELECTRICAL COLOR MASKING FOR A PHOTOELECTROPHORETIC IMAGING PROCESS. FEB. 6, 1973. BEL. 0763539, CAN. 0938491, FRA. 7107557. GRB. 1347139, ITL. 0918979, JAP. 0752723, MEX. 0120935.

3,810,758.—PHOTOGRAPHIC MASKING SYSTEM. MAY 14, 1974.

Class 12M

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.

3,402,177.—SUBSTITUTED 1-CYANO-2, 3-PHTHALOYL-7, 8-BENZOPYRROCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODLOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPHTO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,474,020.—PHOTOELECTROPHORETIC IMAGING PROCESS USING QUINACRIDONES. OCT. 21, 1969. ARG. 0154377, AUS. 0414491, BEL. 0683405, CAN. 0834673, FRA. 0090574, GRB. 1155403, ITL. 0842587, JAP. 0601872, MEX. 0088935, SPN. 0328503, SWD. 6608734, VZL. 0023989.

3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINOANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 0155985, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.

3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUORESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965, JAP. 0586923.

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.

3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.

3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.

3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

3,560,360.—PHOTOELECTROPHORETIC IMAGING PROCESS AND ANTHRAQUINONES AS THE ELECTRICALLY PHOTOSENSITIVE PARTIC. FEB. 2, 1971. CAN. 0850590, MEX. 0096584.

3,562,248.—BISAZO PGMTS DRVD CPLRS OBTD CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484. GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,615,558.—PHOTOLECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY-DIVIDED PHTHALOCYANINE PIGMENT. OCT. 26, 1971. CAN. 0850022.

3,616,393.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA RNS. OCT. 26, 1971.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,635,981.—PHOTOELECTROPHORETIC IMAGING PIGMENT COMPOSITION AND PROCESS. JAN. 18, 1972. ARG. 0193337, ATR. 0305459, AUS. 0448778, BEL. 0741064, CAN. 0953143, FRA. 6937772, GER. 1955001, GRB. 1285610, ITL. 0879711, JAP. 0685461, MEX. 0114879.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,652,438.—PHTELCTRPHRTC IMGNG PROCS USNG DIVLNT HVY MTL SLT OR 1-1-SULFO-2-NAPHYLZO-2-NAPHLS AS IMGNG MAT. MAR. 28, 1972.

3,658,675.—PHOTOELECTROPHORETIC IMAGING PROCESS USING BISAZO PIGMENTS. APR. 25, 1972.

3,692,517.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING AN INSULATING CARRIER LQD CNTNG UNSATURATED COMP. SEPT. 19, 1972. ARG. 0164485, AUS. 0430397, BEL. 0715670, CAN. 0913968, FRA. 1563583, GER. 1772522, GRB. 1225316, ITL. 0834948, JAP. 0641521, MEX. 0100255, VZL. 0032921.

3,705,901.—PHOTOELECTROPHORETIC IMAGING COMPOSTION. DEC. 12, 1972.

3,753,708.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING QUINACRIDONE PIGMENTS. AUG. 21, 1973.

3,758,305.—PHOTOELECTROPHORETIC IMAGING PROCESS. SEPT. 11, 1973.

3,825,422.—IMAGING PROCESS. JULY 23, 1974. CAN. 0984201, GRB. 1442667.

3,867,141.—PHOTOELCTRC AND ELCTRPHOTGRPHC PGMNTS COMPRISNG DERIVATIVS OF CNDNSD PLYCLC AROMTC HYDROCRBN ALDE. FEB. 18, 1975.

3,922,169.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. NOV. 25, 1975.

3,923,506.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. DEC. 2, 1975.

3,953,462.—IMAGING PROCESS. APR. 27, 1976. ARG. 0202139, BEL. 0821400, GRB. 1467999.

3,957,829.—CERTAIN DINAPHTHO (1,2-B;2',3'-D)-FURAN-7,12 DIONES. MAY 18, 1976.

4,012,252.—IMAGING PROCESS UTILIZING 3-BROMO-N-2'''-PYRIDYL-8,13-DIOXODIMAPHTHO-(2,1-; 3',3'-)-FURON-6-CARBO. MAR. 15, 1977. ARG. 0202139, BEL. 0821400, GRB. 1467999.

4,017,311.—PHOTOELECTROPHORETIC IMAGING SUSPENSION. APR. 12, 1977.

4,032,339.—PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORECTIC IMAGING. JUNE 28, 1977.

4,062,854.—PROCESS FOR PREPARING N-SUBSTITUTED-8,13-DIOXODINAPHTHO-(2,1-B; 2,3-D)FURAN-6-CARBOXAMIDE. DEC. 13, 1977. CAN. 1023360, FRA. 7423881.

4,076,527.—PHOTOSENSITIVE COMPOSITION USEFUL IN PHOTOELECTROPHORETIC IMAGING. FEB. 28, 1978.

4,104,064.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING DINAPHTHO-FURAN-DIONE PIGMENTS. AUG. 1, 1978.

Class 12N

3,446,722.—ELECTROPHORETIC REFINING OF PHOTOSENSITIVE PARTICLES. MAY 27, 1969. AUS. 0424699, BEL. 0743903, CAN. 0840368. GER. 1622376, GRB. 1189636.

3,473,940.—PREPARATION OF PHOTOELECTROPHORETIC IMAGING SUSPENSION. OCT. 21, 1969. BEL. 0743899, CAN. 0847808, FRA. 1524448, GER. 1572386, GRB. 1161780, ITL. 0794432, JAP. 0594583, MEX. 0097623.

3,477,934.—IMAGING PROCESS. NOV. 11, 1969. ARG. 0158372, AUS. 0416251, BEL. 0700645, CAN. 0850023, FRA. 1550998, GRB. 1196044, ITL. 0804665, JAP. 0725097, MEX. 0098737, SPN. 0342376, STZ. 0481408, SWD. 0336525, VZL. 0021263.

3,551,313.—IMAGE CONTRAST CONTROL IN PHOTOELECTROPHORETIC IMAGING - PHAROS CONTRAST CONTROL. DEC. 29, 1970. ATR. 0302814, AUS. 0448317, BEL. 0738218, CAN. 0899689, FRA. 6929449, GER. 1944510, GRB. 1274525, ITL. 0871538, JAP. 0708365, SWD. 0341130.

3,553,093.—COLOR PHOTOELECTROPHORETIC IMAGING PROCESS. JAN. 5, 1971. ATR. 0286783, AUS. 0416331, BEL. 0692911, CAN. 0818388, FRA. 1471745, GER. 1522743, GRB. 1149665, IND. 0104183, ISR. 0025304. ITL. 0762674, JAP. 0608337, MEX. 0089790, NOR. 0123368, NZL. 0144531, STZ. 0479099, SWD. 0334540.

3,586,615.—PHOTOELECTROPHORETIC IMAGING PROCESS INCLUDING THE USE OF AN ELECTRICALLY CHRGD SUSPNSN COATNG. JUNE 22, 1971. BEL. 0743921, CAN. 0891972, FRA. 6945567, GER. 1965460, GRB. 1284429, HOL. 1284429, ITL. 0880418, JAP. 0729281.

3,595,770.—SEQUENTIAL PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176384, ATR. 0299697, AUS. 0429715, BEL. 0722300, BRA. 0087996, CAN. 0891970, CHL. 0024332, DNK. 0126879, FRA. 1589548, GRB. 1239259, ITL. 0845021, LXB. 0057101, MEX. 0103850, NZL. 0154114, PNM. 0001418, PTG. 0050485, SAF. 0686705, SPN. 0359239, STZ. 0496265, SWD. 0339172, URG. 0009317, VZL. 0023705.

3,601,483.—IMAGING APPARATUS. AUG. 24, 1971.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,616,390.—ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRCLY PHOTSNSTV PRTCLS AT LIQUI. OCT. 26, 1971. ATR. 0322980, AUS. 0448380. BEL. 0743423, CAN. 0890356, FRA. 6944288, GER. 1947105, GRB. 1249546, ITL. 0879048, JAP. 0688351.

3,616,395.—PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION. OCT. 26, 1971. CAN. 0922142, GRB. 1318565, JAP. 0756962.

3,620,950.—ELECTROPHORETIC IMAGING EMPLOYING PERIODIC ELECTROMAGNETIC RADIATION. NOV. 16, 1971. ATR. 0302045, AUS. 0449606, BEL. 0739750, CAN. 0887022, FRA. 5934262, GRB. 1283384, ITL. 0877875, JAP. 0718339.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,642,598.—PHOTOELECTROPHORETIC IMAGING METHOD AND APPARATUS. FEB. 15, 1972. ARG. 0188632, BEL. 0756481, CAN. 0922144, FRA. 7034709, GRB. 1324105, ITL. 0908073, JAP. 0740359, MEX. 0115601, VZL. 0032786.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,647,659.—PHTELCTRPHRTC IMGNG PRCS WHEREIN IMGNG ELCTRCL FLD APPLD SUBSEQUENT TO IMAGE WISE EXPOSURE. MAR. 7, 1972. BEL. 0772912, CAN. 0958581, FRA. 7134730, GRB. 1354798, ITL. 0936734.

3,657,091.—ELECTROPHORETIC IMAGING METHOD EMPLOYING A PERIODIC ELECTRIC FIELD. APR. 18, 1972. ARG. 0174612, ATR. 0302816, AUS. 0448524, BEL. 0739752, CAN. 0913970, FRA. 6933735, GRB. 1282469, ITL. 0889439, JAP. 0709039, MEX. 0114739.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,664,941.—PHTELCTRPHRTC REVERSAL IMGNG USNG SUSPENSION CONTAINING VITAMIN PRECURSOR, B-CAROTENE. MAY 23, 1972.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,676,313.—REMOVING UNDESIRED POTENTIAL FROM BLOCKING ELECTRODE IN A PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 11, 1972.

3,681,221.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. AUG. 1, 1972. CAN. 0935013, GRB. 1348121.

3,696,020.—ELECTROPHORETIC IMGNG APRTS INCLUDING MEANS TO COAT AND ELCTRFY IMGNG ELCTRODE. OCT. 3, 1972.

3,723,288.—ELECTROPHORETIC IMAGING APPARATUS INCLUDING MEANS TO PROJECT AN IMAGE AT A LIQUID NIP. MAR. 27, 1973.

3,737,310.—BACKGROUND REDUCTION. JUNE 5, 1973.
3,741,639.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. JUNE 26, 1973.
3,741,760.—IMAGING SYSTEM. JUNE 26, 1973.
3,748,035.—METHOD FOR SEQUENTIAL ILLUMINATION IN A POLYCHROME PROCESS. JULY 24, 1973. CAN. 0960288, GRB. 1416328.
3,772,013.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING ELECTRICALLY PHOTOSENSITIVE PARTICLES AND INERT PA. NOV. 13, 1973. ARG. 0196295, ATR. 0327682, BEL. 0777724, CAN. 0957543, FRA. 7200998, GRB. 1370026, ITL. 0946356, JAP. 0759477, MEX. 0124561, SPN. 0398586, SWD. 0367075, VZL. 30687.
3,782,932.—ELECTROPHORETIC IMAGING PROCESS USING TRANSPARENT PARTICLES. JAN. 1, 1974. ATR. 0302043, AUS. 0446066, BEL. 0743424, CAN. 0913441, FRA. 6944289, GER. 1949149, GRB. 1280900, ITL. 0897053. JAP. 0699518.
3,785,816.—ELIMINATING CORONA ARCING IN PHOTOELECTROPHORETIC IMAGING. JAN. 15, 1974.
3,787,206.—PHOTOELECTROPHORETIC IMAGING METHOD INCLUDING AT LEAST ONE ELECTRODE CARRYING A PATTERN. JAN. 22, 1974.
3,801,195.—ELECTROPHORETIC IMAGING. APR. 2, 1974. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.
3,804,620.—METHOD OF PRODUCING PLANOGRAPHIC PLATES BY PHOTOELECTROPHORETIC IMAGING. APR. 16, 1974.
3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.
3,850,627.—ELECTROPHORETIC IMAGING METHOD. NOV. 26, 1974. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,857,549.—PHOTOELECTROPHORETIC IMAGING APPARATUS. DEC. 31, 1974.
3,857,707.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DRY PIGMENT COATED SUBSTRATE. DEC. 31, 1974.
3,881,920.—PHOTOELECTROPHORETIC IMAGING PROCESS. MAY 6, 1975.
3,901,701.—PHOTOELECTROPHORETIC IMAGING PROCESS USING PHOTOCONDUCTIVE ELECTRODE WHICH ALTERS SPECTRAL RESPONSE. AUG. 26, 1975.
3,905,812.—IMAGING PROCESS. SEPT. 16, 1975. FRA. 7413994, GRB. 1443121.
3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,933,487.—IMAGING COMPOSITION FOR PHOTOELECTROPHORETIC IMAGING SYSTEM. JAN. 20, 1976. CAN. 0973005, GRB. 1375941.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,961,949.—PHOTOELECTROPHORETIC IMAGING METHOD PRODUCING A DESIRED IMAGE BORDER. JUNE 8, 1976.
3,967,960.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING DARK CHARGE INJECTING ELEMENT. JULY 6, 1976.
4,023,968.—PHOTOELECTROPHORETIC COLOOR IMAGING PROCESS IN WHICH BACK MIGRATION IS ELIMINATED. MAY 17, 1977.
4,069,047.—TRANSFER OF PHOTOELECTROPHORETIC IMAGES. JAN. 17, 1978.
4,078,928.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 14, 1978.

Class 12O

3,647,660.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION. MAR. 7, 1972.
3,869,286.—PHOTOELECTROPHORETIC IMAGING WITH COPPER-FREE CHLOROPHYLL IN THE CARRIER LIQUID. MAR. 4, 1975.

Class 12P

RE.28,260.—ELECTROPHORETIC IMAGING PROCESS INCLUDING APPL OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION. DEC. 3, 1974. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.
3,595,772.—METHOD OF BREAKING PARTICLE AGGLOMERATES IN THE PHOTO-ELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176808, ATR. 0293875, AUS. 0445175, BEL. 0739749, CAN. 0912398, FRA. 6934261, GRB. 1290370, ITL. 0887503, JAP. 0712831, MEX. 0127747.
3,616,391.—ELECTROPHRTC IMGNG PRCSS INC APPLCTN OF DYNAMIC STRESS ON PARTCL SUSPSN-REISSUED D 2177R. OCT. 26, 1971. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.
3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.
3,743,404.—PHTOELECTROPHORETIC IMGNG APPTS INCNG MEANS TO SIMULTNUSLY APPLY COMPRSVE STRESS AND SHEAR TO IMGNG. JULY 3, 1973.
3,784,302.—ELECTROPHORETIC IMAGE APPARATUS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENS. JAN. 8, 1974.
3,833,493.—IMAGING PROCESS. SEPT. 3, 1974.
3,943,049.—APPARATUS FOR SEPARATING AGGLOMERATED PARTICLES WITH SUSPENSION. MAR. 9, 1976.

Class 12Q

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,655,370.—PHOTOELECTROPHORETIC IMAGE TRANSFER. APR. 11, 1972.
3,705,797.—FIXING PROCESS FOR PHOTOELECTROPHORETIC IMAGING. DEC. 12, 1972.
3,711,196.—IMAGE TRANSFER. JAN. 16, 1973.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,804,508.—PHOTOELECTROPHORETIC APPARATUS FOR HEAT FACING AN IMAGE. APR. 16, 1974.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.
4,065,304—METHOD FOR FIXING INK IMAGES. DEC. 27, 1977. BEL. 848487.

Class 12R

3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0899118, JAP. 0710908.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.
3,682,628.—PHOTOELECTROPHORETIC FACSIMILE TRANSMISSION. AUG. 8, 1972. CAN. 0957889, GRB. 1365163.
3,800,302.—RECORDING OSCILLOGRAPH UTILIZING PHOTOELECTROPHORETIC TECHNIQUES. MAR. 26, 1974.
3,849,132.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A CHROMOGENIC REACTION. NOV. 19, 1974. BEL. 0809399, GRB. 1447104.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

Class 15

3,693,517.—PRINTING APPARATUS—KALEIDOSCOPE PRINTER WITH CIRCUMFERENTIAL STRIPS. SEPT. 26, 1972. CAN. 0948265, GRB. 1330327.
3,801,319.—IMAGING METHOD UTILIZING CHEMICAL REACTIVITIES OF PHOTOEXCITED STATES OF AROMATIC HYDROXY COMPO. APR. 2, 1974. CAN. 1000549, GRB. 1429501.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.
3,851,584.—CHEMICAL REPRODUCTION SYSTEMS. DEC. 3, 1974.
3,888,670.—IMAGING METHOD. JUNE 10, 1975.
3,915,706.—IMAGING SYSTEM BASED ON PHOTODEGRADABLE POLYALDEHYDES. OCT. 28, 1975.

3,923,514.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. DEC. 2, 1975.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,930,858.—HEAT DEVELOPMENT PROCESS UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A HALOGENATED POLYME. JAN. 6, 1976.
3,963,491.—IMAGING METHOD. JUNE 15, 1976.
3,986,874.—DRIOGRAPHIC IMAGING METHOD. OCT. 19, 1976.
3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.
4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.
4,032,980.—RECORDED MAGNETIC MEMBER VIEWING APPARATUS. JUNE 28, 1977.
4,043,298.—MAGNETIC TONER SCAVENGING SYSTEM. AUG. 23, 1977.
4,064,453.—MAGNETIC FIELD DETECTOR. DEC. 20, 1977.
4,074,276.—MAGNETIC IMAGING SYSTEM USING HEAT. FEB. 14, 1978.
4,076,387.—MAGNETIC DISPLAY. FEB. 28, 1978.
4,089,684.—IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES. MAY 16, 1978.
4,095,233.—METHOD FOR FORMING A CHARGE PATTERN. JUNE 13, 1978.
4,100,088.—IMAGING COMPOSITION. JULY 11, 1978.
4,101,943.—CONTROLLED-WIDTH-SYNCHRONIZATION OF RECORDED PIXELS. JULY 18, 1978.
4,115,786.—CONSTANT WAVELENGTH MAGNETIC RECORDING. SEPT. 19, 1978.
4,133,683.—AGGLOMERATION IMAGING METHOD. JAN. 9, 1979.
4,135,194.—ROTARY HEAD MAGNETIC RECORDING AT FIXED WAVELENGTH WITH VARYING SPEEDS. JAN. 16, 1979.

Class 15A

3,320,060.—DEFORMATION IMAGE REPRODUCTION PROCESS UTILIZING A VOLTAGE THRESHOLD REDUCING SURFACTANT. MAY 16, 1967. CAN. 0807325, FRA. 1416119, GER. 1261867, GRB. 1097919, ITL. 0739830, JAP. 0519668.
3,338,710.—FROST THERMOGRAPHY. AUG. 29, 1967.
3,404,001.—THERMOPLASTIC DEFORMATION IMAGING WITH COLOR REAGENTS. OCT. 1, 1968. CAN. 0801265, FRA. 1459100, GER. 1497214, GRB. 1124925, ITL. 0725974, JAP. 0529727.
3,615,387.—STRIPPABLE LAYER RELIEF IMAGING PROCESS. OCT. 26, 1971. CAN. 0887033.
3,697,184.—APPARATUS FOR EVALUTING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1083484, GRB. 1389471.
3,715,207.—ELCTRSTCLY DEFORMABLE THERMOPLASTIC LAYER CONTAINING A 1,4-DIALKYLAMINO-9, 10-ANTHRAQUINONE DYE. FEB. 6, 1973.
3,729,310.—SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER. APR. 24, 1973.
3,741,759.—FROST IMAGING PROCESS. JUNE 26, 1973.
3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.
3,869,612.—COPY APPARATUS WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING. MAR. 4, 1975. STZ. 0032775.
3,893,416.—DEVELOPMENT AND CLEANING APP FOR REVERSE PATH MACHINE. JULY 8, 1975.
3,902,062.—REVERSE PATH IMAGING AND TRANSFIXING COPYING METHOD. AUG. 26, 1975. BEL. 0823656.
3,904,875.—SINGLE RADIATION RAY PATH FOR THERMOGRAPHIC IMAGING & TRANSFIXING OR FUSING. SEPT. 9, 1975. ARG. 0207128.
3,906,896.—INK APPLICATOR. SEPT. 23, 1975. CAN. 0974753.
3,908,125.—REVERSE PATH IMAGING AND TRANSFIXING COPYING MACHINE. SEPT. 23, 1975.
3,909,613.—COPYING METHOD AND APP WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING OR FUS. SEPT. 30, 1975.
3,923,004.—DEVELOPMENT AND CLEANING APPARATUS FOR REVERSE PATH MACHINE. DEC. 2, 1975. BEL. 0823656.
3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,946,230.—COPY METHOD UTILIZING SINGLE RADIANT RAY PATH FOR IMAGING AND TRANSFIXING. MAR. 23, 1976.
3,949,160.—ELECTRO-OPTIC READ OUT OF THERMOPLASTIC DEFORMATION PATTERNS. APR. 6, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,262.—METHOD OF MAKING A SUBSTRATE STRIPED PLANAR LASER. OCT. 5, 1976.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.
4,051,463.—METHOD AND APPARATUS FOR INVERTING THE POLARITY OF AN INPUT IMAGE FORMED ON A SURFACE OF AN. SEPT. 27, 1977. FRA. 7701769.
4,063,222.—SELECTIVE ERASURE OF IMAGE RECORDING DEVICES. DEC. 13, 1977. FRA. 7701592.
4,099,262.—AUTOMATIC MEMORY CONTROL FEEDBACK SYSTEM FOR A CYCLING OPTICAL IMAGING SYSTEM. JULY 4, 1978.
4,109,316.—METHOD AND APPARATUS FOR INVERTING THE POLARITY OF AN INPUT IMAGE FORMED ON A SURFACE OF. AUG. 22, 1978.
4,133,611.—TWO-PAGE INTERWEAVED RANDOM ACCESS MEMORY CONFIGURATION. JAN. 9, 1979.

Class 15B

3,350,205.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. OCT. 31, 1967. CAN. 0717934, GRB. 1095174, JAP. 0561238.
3,561,962.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. FEB. 9, 1971.
3,834,906.—LIGHT ACTIVATING IMAGING PROCESS. SEPT. 10, 1974.
3,885,963.—LIGHT ACTIVATING IMAGING PROCESS. MAY 27, 1975.
3,890,147.—LIGHT ACTIVATING IMAGING PROCESS. JUNE 17, 1975.
3,892,180.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.
3,892,570.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

Class 15B 2

3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.

Class 15C

3,250,636.—MTD AND APTS IMAGE REPRODCTN W/USE OF REUSABLE HEAT DEMAGNETIZABLE FERROMAGNETIC IMAGING LAYER. MAY 10, 1966. CAN. 0711404, GRB. 1070986, JAP. 0487336.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GER. 1671576, GRB. 1208307.
4,014,065.—MAGNETIC DEVELOPER REMOVAL SYSTEM. MAR. 29, 1977.
4,030,104.—THERMO-MAGNETIC IMAGE TRANSFER APPARATUS. JUNE 14, 1977.
4,032,923.—THERMOMAGNETIC IMAGING APPARATUS. JUNE 28, 1977.
4,035,810.—MAGNETIC INTERPOSITIVE METHOD WITH ELECTROSTATIC IMAGING. JULY 12, 1977.
4,038,665.—DONOR TRANSFER OF MAGNETIC TONER. JULY 26, 1977.
4,060,811.—MAGNETIC LATENT IMAGE CREATION. NOV. 29, 1977.
4,067,018.—EXCESSIVE MAGNETIC DEVELOPER DISPLACEMENT SYSTEM. JAN. 3, 1978.
4,092,954.—HIGH SPEED TANK DEVELOPMENT SYSTEM. JUNE 6, 1978.
4,096,485.—SUCCESSIVE DEVELOPMENT MAGNETIC IMAGING APPARATUS. JUNE 20, 1978.
4,101,320.—MAGNETIC IMAGING METHOD. JULY 18. 1978.
4,101,904.—MAGNETOGRAPHIC IMAGING MEMBER AND THE METHOD OF ITS USE. JULY 18, 1978.
4,101,943.—CONTROLLED-WIDTH-SYNCHRONIZATION OF RECORDED PIXELS. JULY 18, 1978.
4,108,111.—DEVELOPER HOUSING. AUG. 22, 1978.
4,108,112.—DEVELOPER HOUSING. AUG. 22, 1978.

4,112,156.—MAGNETIC TONER RECOVERY METHOD USING ALTERNATING MAGNETIC FIELD POLARITIES. SEPT. 5, 1978. GRB. 1530562.
4,115,786.—CONSTANT WAVELENGTH MAGNETIC RECORDING. SEPT. 19, 1978.
4,121,261.—SYNCHRONOUS HELICAL SCAN-HELICAL RECORD MAGNETIC IMAGING. OCT. 17, 1978.
4,135,194.—ROTARY HEAD MAGNETIC RECORDING AT FIXED WAVELENGTH WITH VARYING SPEEDS. JAN. 16, 1979.
4,138,685.—RECORDING WITH IMAGEWISE ALTERATION OF MAGNETIC ATTRACTION OF DONOR. FEB. 6, 1979.

Class 15D

3,441,410.—DEFORMATION IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. APR. 29, 1969. CAN. 0801267, FRA. 1485348, GER. 1522696, GRB. 1156151, JAP. 0545759.
3,441,411.—IMAGE FORMATION THROUGH CHEMICAL REACTION OF PHOTOCHROMIC MATER. APR. 29, 1969. CAN. 0834676, GRB. 1165215.
3,442,646.—FRMATION OF LIGHT SCATTERING IMGS IN LAYERS COMPRSNG ORGANIC PHOTOCHROMIC MATERIALS. MAY 6, 1969. GRB. 1164484.
3,450,530.—PHOTOGRAPHIC IMAGING BY MEANS THE SURFACE TENSION CREATED BY PHOTOCHROMIC MATERIALS. JUNE 17, 1969.
3,450,531.—ADHESIVE IMAGING ON PHOTOCHROMIC LAYERS. JUNE 17, 1969.
3,450,533.—FORMATION OF LIGHT SCATTERING IMAGES IN PHOTOCHROMIC LAYERS. JUNE 17, 1969. CAN. 0875500.
3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.
3,967,964.—PHOTOSENSITIVE FILM COPRINSING AN ORGANOSELENIUM AND AN ORGANSMERCURY. JULY 6, 1976.
3,973,966.—PHOTOCHROMIC COMPOSITION CONTAINING A DIPHENYL DIBENZOCHRON-3-ENE. AUG. 10, 1976.
4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.
4,050,937.—IMAGEWISE EXPOSING AND HEATING A MICROIMAGING FILM CONTAINING AN ORGANO DISELENIDE, A TERTI. SEPT. 27, 1977.
4,050,939.—MICROIMAGING FILM CONTAINING AN ORGANO DISELENDIE, A TERTIARY PHOSPHINE OR PHOSPHITE AND AN. SEPT. 27, 1977.
4,106,936.—MICROIMAGING FILM CONTAINING AN ORGANIC DISELENIDE, A TERTIARY PHOSPHINE OR PHOSPHITE & IN. AUG. 15, 1978.

Class 15D 3

4,133,611.—TWO-PAGE INTERWEAVED RANDOM ACCESS MEMORY CONFIGURATION. JAN. 9, 1979.

Class 15E

3,635,708.—VESICULAR IMAGING PROCESS. JAN. 18, 1972.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

Class 15F

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,753,705.—AGGLOMERATION IMAGING PROCESS USING HARDENABLE MATERIAL. AUG. 21, 1973. CAN. 0929350, GRB. 1330518.
4,029,502.—IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL. JUNE 14, 1977. ARG. 0172317, BEL. 0737813, CAN. 0884217, FRA. 6928725, GER. 1942380, GRB. 1286501, ITL. 0870234, SWD. 0340954.
4,082,549.—AGGLOMERATION IMAGING PROCESS. APR. 4, 1978.
4,084,966.—IMAGING SYSTEM USING AGGLOMERABLE MIGRATION MARKING MATERIAL. APR. 18, 1978.
4,133,683.—AGGLOMERATION IMAGING METHOD. JAN. 9, 1979.

Class 17A

3,909,609.—LIGHT SOURCE MEASURING APPARATUS. SEPT. 30, 1975.

Class 17A 1

2,774,887.—RADIATION SENSING DEVICE. DEC. 18, 1956.
3,445,660.—METHOD FOR DETECTION OF ULTRAVIOLET RADIATION. MAY 20, 1969.

Class 17A 2

3,330,700.—SOLAR-CELL PANELS. JULY 11, 1967.
3,359,137.—SOLAR CELL CONFIGURATION. DEC. 19, 1967.
3,513,040.—RADIATION RESISTANT SOLAR CELL. MAY 19, 1970.

Class 17A 3

3,351,493.—DIFFUSED RADIATION TRACKING TRANSDUCER HAVING A LATERAL PHOTO VOLTAGE JUNCTION. NOV. 7, 1967.
3,443,102.—SEMICONDUCTOR PHOTOCELL DETECTOR WITH VARIABLE SPECTRAL RESPONSE. MAY 6, 1969.

Class 17A 4

3,901,607.—HIGH APERTURE REFLECTION PHOTODETECTOR APPARATUS. AUG. 26, 1975.
4,085,321.—MULTIPHASE PHOTOACTIVATED SWITCH. APR. 18, 1978.

Class 17B

3,650,604.—INTER-FERAMETRIC SCANNING APPARATUS AND METHOD. MAR. 21, 1972. CAN. 0954354, GRB. 1363263.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,902,061.—DIGITAL OPTICAL COMPUTER TECHNIQUES. AUG. 26, 1975.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,987,685.—CURSOR POSITION DEVICE. OCT. 26, 1976.
4,162,118.—WAVEGUIDE IMAGING SYSTEM. JULY 24, 1979.

Class 17B 1

3,476,473.—FONT INDICATOR. NOV. 4, 1969.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,501,838.—PANTOGRAPHIC IMPLEMENTED OVERHEAD PROJECTOR. MAR. 24, 1970.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,677,148.—OPTICAL RECORDER. JULY 18, 1972.
3,678,820.—OPTICAL SYSTEM FOR PROJECTION RECORDING APPARATUS. JULY 25, 1972.
3,685,406.—OPTICAL RECORDER. AUG. 22, 1972. BEL. 0777014, CAN. 0960743, FRA. 7146254, GRB. 1372379, ITL. 0944111.
3,695,161.—ALPHANUMERIC PROJECTION DISC ASSEMBLY. OCT. 3, 1972.
3,700,325.—OPTICAL SYSTEM FOR PHOTOCOPYING APPARATUS. OCT. 24, 1972. BEL. 0764830, CAN. 0931409, FRA. 7111622, GRB. 1337447, ITL. 0922162.
3,705,543.—OPTICAL RECORDER. DEC. 12, 1972. CAN. 0948266, GRB. 1372378.
3,759,149.—MULTIPLE FLASH LAMP ALPHANUMERIC PROJECTION DISC ASSEMBLY. SEPT. 18, 1973. CAN. 1002363.
3,759,612.—OPTICAL SYSTEM. SEPT. 18, 1973. BEL. 0792669, CAN. 0972193, FRA. 7243897, GRB. 1395580, ITL. 0984616, SWD. 7216146.
3,768,384.—PROJECTION ASSEMBLY. OCT. 30, 1973.
3,873,207.—POLARIZING INTERFEROMETER. MAR. 25, 1975.
3,880,497.—METHOD OF STORING OPTICAL INFORMATION ON A RANDOM CARRIER. APR. 29, 1975. CAN. 1004887, FRA. 7408054.
3,883,244.—APERTURE ADJUSTMENT IN OPTICAL ASSEMBLY. MAY 13, 1975.
3,897,136.—POLARIZATION-GRATING MOIRE. JULY 29, 1975.

3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
4,035,068.—SPECKLE MINIMIZATION IN PROJECTION DISPLAYS BY REDUCING SPATIAL COHERENCE OF IMAGE LIGHT. JULY 12, 1977.
4,082,450.—COMPACT ILLUMINATION SYSTEM FOR OPTICALLY PROVIDING A STRUCTURED PHOTORECEPTOR CHARGE DIST. APR. 4, 1978.
4,082,451.—COMPACT ILLUMINATION SYSTEM FOR OPTICALLY PROVIDING A STRUCTURED PHOTORECEPTOR CHARGE DISTR. APR. 4, 1978.
4,110,023.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE. AUG. 29, 1978.
4,113,370.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE. SEPT. 12, 1978.
4,143,943.—REAR PROJECTION SCREEN SYSTEM. MAR. 13, 1979.
4,162,118.—WAVEGUIDE IMAGING SYSTEM. JULY 24, 1979.

Class 17B 2

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427. ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,508,812.—HIGHLY CORRECTED SIX ELEMENT GAUSS TYPE LENS. APR. 28, 1970.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660, JAP. 0857539.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,612,662.—EYEPIECE HAVING A WIDE FIELD OF VIEW AND A LARGE EYE RELIEF. OCT. 12, 1971.
3,620,603.—OFF-CENTER FOCUSING SYSTEM. NOV. 16, 1971.
3,630,599.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. DEC. 28, 1971. CAN. 0960891, GRB. 1363113.
3,640,605.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. FEB. 8, 1972.
3,659,922.—SYMMETRICAL HALF-LENS OPTICAL SYSTEM. MAY 2, 1972.
3,672,748.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JUNE 27, 1972. ATR. 0322874, AUS. 0467299, BEL. 0783478, CAN. 0960495, GRB. 1358349, ITL. 0955474, SPN. 0402705, STZ. 0544315, SWD. 7206274.
3,741,621.—ADD LENS PROJECTION SYSTEM WITH BALANCED PERFORMANCE. JUNE 26, 1973. BEL. 0781514, CAN. 0963300, FRA. 7208375, GRB. 1393151, ITL. 0950848.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974. CAN. 1008710.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.
3,865,471.—LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE. FEB. 11, 1975.
3,880,498.—ZOOM LENS ASSEMBLY. APR. 29, 1975.
3,907,401.—HIGH PERFORMANCE OPTICAL OBJECTIVE. SEPT. 23, 1975.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 17B 3

3,393,956.—UNIFORM-FIELD KERR CELL. JULY 23, 1968.
3,408,133.—KERR-CELL CAMERA SHUTTER. OCT. 29, 1968.

Class 17B 4

3,358,081.—FACSIMILE PRINTER WITH FERROELECTRIC MODULATOR. DEC. 12, 1967. CAN. 0898336, GRB. 1128973.
3,360,323.—TRANSVERSE MAGNETO-OPTICAL ROTATOR WITH COMPENSATION OF PHASE BETA RDATION. DEC. 26, 1967.
3,601,468.—OPTICAL LIGHT WAVE MODULATOR FOR REPRESENTING A FIRST COLOR LIGHT WAVE AS SECOND COLOR LIGHT WA. AUG. 24, 1971.
3,938,881.—ACOUSTO-OPTIC MODULATION DEVICE. FEB. 17, 1976.
4,011,009.—REFLECTION DIFFRACTION GRATING HAVING A CONTROLLABLE BLAZE ANGLE. MAR. 8, 1977.
4,050,027.—OPTICAL SIGNAL AMPLIFIER. SEPT. 20, 1977.
4,077,700.—WAVEGUIDE ADDRESSING AND MODULATING METHOD AND APPARATUS. MAR. 7, 1978.
4,106,848.—ELASTOMER WAVE GUIDE OPTICAL MODULATORS. AUG. 15, 1978. GRB. 1531900.
4,128,299.—WAVEGUIDE OPTICAL MODULATOR. DEC. 5, 1978.

Class 17C

3,870,921.—IMAGE INTENSIFIER TUBE WITH IMPROVED PHOTOEMITTER SURFACE. MAR. 11, 1975.
4,074,143.—OPTOELECTRONIC DEVICE WITH OPTICAL FEEDBACK. FEB. 14, 1978. FRA. 7631992.
4,138,190.—GEOMETRICAL TRANSFORMATIONS IN OPTICS. FEB. 6, 1979. GRB. 1502127.

Class 17C 1

3,277,297.—ION IMAGE TO ELECTRON IMAGE CONVERTER. OCT. 4, 1966.
3,322,999.—IMAGE-INTENSIFIER TUBE. MAY 30, 1967.
3,519,870.—SPIRLD STRIP MATRL HAVNG PRLEL GROVS FRMNG PLURALITY OF ELCTRN MULTIPLIER CHANNELS. JULY 7, 1970.
3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

Class 17C 2

3,368,077.—INFRA-RED IMAGE INTENSIFIER HAVING A TUNNEL-EMISSION CATHODE HAVING A CONDUCTIVE MOSAIC. FEB. 6, 1968.
3,949,225.—INFRARED IMAGING APPARATUS. APR. 6, 1976.

Class 17C 3

3,446,561.—PASSIVE BRIGHT PATTERN RETICLE. MAY 27, 1969.
3,837,732.—PARTIALLY TRANSPARENT PLATED FOR INCREASED IMAGE CONTRAST. SEPT. 24, 1974. CAN. 0893234, GRB. 1237697, JAP. 0645592.

Class 17C 4

3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.

Class 17D

D.235,655.—DISPLAY DEVICE. JULY 1, 1975.
3,987,413—DETECTION SYSTEM. OCT. 19, 1976.
4,035,061.—HONEYCOMB DISPLAY DEVICES. JULY 12, 1977.
4,111,538.—PROJECTION SYSTEM OF HIGH EFFICIENCY. SEPT. 5, 1978.
4,126,528.—ELECTROPHORETIC COMPOSITION AND DISPLAY DEVICE. NOV. 21, 1978.
4,126,854.—TWISTING BALL PANEL DISPLAY. NOV. 21, 1978.
4,143,103.—METHOD OF MAKING A TWISTING BALL PANEL DISPLAY. MAR. 6, 1979.

Class 17D 1

3,422,737.—VARIABLE FONT CHARACTER GENERATOR. JAN. 21, 1969. ARG. 0157019, BRA. 0087922, CAN. 0788611, CHL. 0022222, FRA. 1506176, GRB. 1162840, ITL. 0788951, JAP. 0590133, MEX. 0094427.

3,519,867.—ELECTRIC DISCHARGE TUBE FOR DISPLAYING ALPHNUMERIC CHARACTER SYMBOLS. JULY 7, 1970.
3,564,319.—CATHOD RAY TUBE W/MATRIX FRMG ELEMNTL ELECTRN BEAMS AND MEANS SELECTVLY FRMG INTO CHAR AT FACE PLA. FEB. 16, 1971.
3,587,083.—CHARACTER GENERATION AND DISPLAY SYSTEM. JUNE 22, 1971. CAN. 0858092, FRA. 1582728, GER. 1774884, GRB. 1234580, ITL. 0846528, JAP. 0678504.
3,641,557.—CIRCUIT ARRANGEMENT FOR AN ELECTRIC DISCHARGE TUBE. FEB. 8, 1972.
3,742,484.—CHARACTER GENERATING APPARATUS EMPLOYING BIT STEAM LENGTH CORRECTION. JUNE 26, 1973.
3,781,848.—DISPLAY SYSTEM - CHARACTER GENERATOR SYSTEM A. DEC. 25, 1973.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,830,646.—IMAGE REGISTRATION CORRECTION FOR NON-IMPACT PRINTERS. AUG. 20, 1974. CAN. 0986764, FRA. 7339099, GRB. 1440507.
3,911,419.—CONTROLLER FOR CURSOR POSITIONING ON A DISPLAY MEDIUM. OCT. 7, 1975.
3,952,296.—VIDEO SIGNAL GENERATING APPARATUS WITH SEPARATES PROCESSING OF ODD AND EVEN VIDEO BITS. APR. 20, 1976.
4,103,331.—DATA PROCESSING DISPLAY SYSTEM. JULY 25, 1978.

Class 17D 2

RE.28,360.—ELECTROPHORETIC COLOR DISPLAY DEVICE. MAR. 4, 1975.
3,524,022.—ELECTRO-OPTICAL DISPLAY SYSTEM. AUG. 11, 1970.
3,588,584.—APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK. JUNE 28, 1971.
3,612,758.—COLOR DISPLAY DEVICE - REISSUED D 2717R. OCT. 12, 1971.

Class 17D 3

3,198,976.—ELECTRIC DISCHARGE TUBES AND APPLICATIONS THEREOF. AUG. 3, 1965.
3,264,638.—ELECTRONIC CODE TRANSLATION. AUG. 2, 1966. CAN. 0740559.
3,349,677.—ALPHA NUMERIC CHARACTER PRINTER. OCT. 31, 1967.
3,403,390.—MESSAGE STORAGE. SEPT. 24, 1968. GRB. 1078401.
3,861,804.—INFEROMETRY READOUT OF PHASE INFORMATION. JAN. 21, 1975. CAN. 0980745, GRB. 1387905.
3,898,377.—VIDEO MIXER. AUG. 5, 1975.

Class 17D 4

3,478,659.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. NOV. 18, 1969.

Class 17D 5

3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.

Class 17E

3,852,775.—MOVING BELT SCANNING PRINTER. DEC. 3, 1974.
4,027,961.—COPIER/PASTER SCAN APPARATUS. JUNE 7, 1977.
4,080,633.—TWISTING GEOMETRY SCANNER. MAR. 21, 1978.
4,135,812.—MAGNIFICATION CHANGE MECHANISM. JAN. 23, 1979.
4,155,620.—ROTATING MIRROR OPTICAL SCANNER WITH FLAT SCAN AND LINEAR SCAN RATE. MAY 22, 1979.
4,160,939.—MOTOR SPEED CONTROL SYSTEM. JULY 10, 1979.

Class 17E 1

3,337,718.—LIGHT SCAN RECORDING AND READOUT. AUG. 22, 1967. CAN. 0794443, GRB. 1070030.
3,426,144.—TRANSCEIVER APPARATUS FOR TRANSMITTING AND RECORDING OPTICAL INFORMATION. FEB. 4, 1969. CAN. 0810757, GRB. 1158568, JAP. 0579399.
3,426,354.—ELECTROSTATIC CHARGE IMAGE RECORDER. FEB. 4, 1969. AUS. 0295167, BEL. 0664729, CAN. 0739120, DNK. 0115269, FRA. 1455131, GER. 1280281, GRB. 1084494, HOL. 0136720, ITL. 0761085, JAP. 0492014, STZ. 0444906, SWD. 0338117.
3,548,195.—RADIATION SENSITIVE DOCUMENT SCANNING MEANS. DEC. 15, 1970. CAN. 0901968, FRA. 1592840, GER. 1809854, GRB. 1230836, ITL. 0848026, JAP. 0587941.
3,553,463.—RADIATION SENSITIVE DOCUMENT SCANNING APPARATUS USING HELICAL SCANNER. JAN. 5, 1971.
3,775,559.—APERTURE DESIGNS FOR FACSIMILE SCANNING APPARATUS. NOV. 27, 1973. CAN. 0960770, GRB. 1376189.
3,820,900.—INSTRUMENT FOR SCANNING DOCUMENT FOR QUALITY. JUNE 28, 1974.
3,867,571.—FLYING SPOT SCANNER. FEB. 18, 1975. CAN. 0995351.
3,898,470.—SCANNING ARRANGEMENT FOR MULTIFUNCTION OPERATION. AUG. 5, 1975.
3,922,485.—FLYING SPOT SCANNER WITH SCAN DETECTION. NOV. 25, 1975.
3,944,323.—VARIABLE SPOT SIZE SCANNING. MAR. 16, 1976. BEL. 0835552.
3,946,150.—OPTICAL SCANNER. MAR. 23, 1976.
3,962,538.—FLYING SPOT SCANNING SYSTEM WITH VIRTUAL SCANNERS. JUNE 8, 1976.
3,966,319.—FLAT FIELD SCREENING MIRROR. JUNE 29, 1976.
3,970,359.—FLYING SPOT FLAT FIELD SCANNER. JULY 20, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,974,506.—SCANNING SYSTEM FOR IMAGING CHARACTERS COMBINED WITH GRAPHIC CURVES. AUG. 10, 1976.
3,997,721.—FLYING SPOT SCANNING SYSTEM WITH REDUCED SCAN ANGLE. DEC. 14, 1976.
4,006,299.—FLAT FILLED SCANNING SYSTEM. FEB. 1, 1977. BEL. 0836543.
4,012,585.—INPUT AND OUTPUT FLYING SPOT SCANNING SYSTEM. MAR. 15, 1977.
4,015,081.—MULTIFUNCTION SCANNING SYSTEM. MAR. 29, 1977. BEL. 0836790.
4,021,897.—A PROCESS FOR PROVIDING CEMENTED GLASS FLATS TO PROVIDE HIGH SPEED MULTIFACETED POLYGONAL SCAN. APR. 10, 1977.
4,034,408.—FLYING SPOT SCANNER. JULY 5, 1977. GRB. 1452300.
4,047,793.—POLYGON SCANNER WITH ANNULAR LIP. SEPT. 13, 1977.
4,052,715.—DIGITAL HALF-TONE GREY SCALE EXPANSION SYSTEM. OCT. 4, 1977.
4,067,639.—HOLOGRAPHIC SCANNING SPINNER. JAN. 10, 1978.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,071,754.—BEAM ALIGNMENT DETECTOR. JAN. 31, 1978.
4,080,633.—TWISTING GEOMETRY SCANNER. MAR. 21, 1978.
4,092,632.—CROSSOVER ARRANGEMENT FOR MULTIPLE SCANNING ARRAYS. MAY 30, 1978.
4,093,350.—A SYSTEM FOR CENTRIFUGALLY CASTING A THIN FILM PLASTIC IN A REPLICA PROCESS FOR PROVIDING M. JUNE 6, 1978.
4,101,365.—PROCESS OF MAKING HIGH SPEED MULTIFACETED POLYGONAL SCANNERS. JULY 18, 1978.
4,122,352.—SCANNING ARRAY CONFIGURATION. OCT. 24, 1978.
4,140,903.—PRECISION SPEED CONTROL FOR OPTICAL SCANNERS. FEB. 20, 1979.
4,143,311.—HYSTERESIS SYNCHRONOUS MOTOR RATE SERVO SYSTEM. MAR. 6, 1979.
4,146,786.—SCANNER WITH MODULAR ARRAY OF PHOTOCELLS. MAR. 27, 1979.
4,149090.—CROSSOVER ARRANGEMENT FOR MULTIPLE SCANNING ARRAYS. APR. 10, 1979.
4,149,091.—SCANNING APPARATUS. APR. 10, 1979.
4,150,402.—METHOD AND APPARATUS FOR REDUCING THE EFFECT OF LASER NOISE IN A SCANNING LASER READ SYSTEM. APR. 17, 1979.
4,162,121.—LINEAR ARRAY MODULATOR. JULY 24, 1979.

Class 17E 2

3,407,329.—SCANNED CONVERSION TUBE. OCT. 22, 1968. CAN. 0836783, GER. 1639461, GRB. 1190967, JAP. 0565840.

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GER. 1597879, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,474,417.—FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE. OCT. 21, 1969. CAN. 0869188, GER. 1549144, GRB. 1203095, JAP. 0568732.
3,523,188.—SEMICONDUCTOR CURRENT CONTROL DEVICE AND METHOD. AUG. 4, 1970.
4,147,928.—SCANNING ARRAY CONFIGURATION. APR. 3, 1979.

Class 17E 3

3,485,945.—ELECTRONIC LENTICULAR RECORDING SYSTEM. DEC. 23, 1969.
3,510,570.—ELECTRONIC LENTICULAR DISPLAY SYS. MAY 5, 1970.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.
3,853,387.—VARIABLE MAGNIFICATION LENS ASSEMBLY HAVING TWO ADD LENSES. DEC. 10, 1974.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.

Class 17E 4

3,279,342.—COMMUNICATION PRINTER. OCT. 18, 1966. CAN. 0767902, GRB. 1120446, JAP. 0698291.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,963,343.—CAMMING SYSTEMS. JUNE 15, 1976. BEL. 0824049.
4,006,648.—CAMMING SYSTEM. FEB. 8, 1977. BEL. 0824049.
4,054,359.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR USING PULLEYS. OCT. 18, 1977.
4,067,640.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR. JAN. 10, 1978.
4,130,838.—SPEED CONTROL APPARATUS FOR SCANNING SYSTEM. DEC. 19, 1978.

Class 17E 5

3,155,022.—BUFFER FOR ELECTRONIC DISPLAY READOUT. NOV. 3, 1964. CAN. 0773751, GRB. 1056114, JAP. 0542586.
3,219,993.—IMAGE FORMATION AND DISPLAY UTILIZING A THERMOTROPICALLY COLOR REVERSIBLE MATERIAL. NOV. 23, 1965. CAN. 0762159, GER. 1222795, ITL. 0753655, JAP. 0474129.
3,249,757.—THERMAL IMAGING DEVICE. MAY 3, 1966.
3,995,278.—SUPERCONDUCTIVE MAGNETOSTATIC PRINTER. NOV. 30, 1976.

Class 17E 6

3,456,074.—IMAGE STABILIZATION OF OPTICAL IMAGING SYSTEMS. JULY 15, 1969.
3,461,227.—MECHANICAL JITTER EQUALIZER. AUG. 12, 1969. CAN. 0824819, GRB. 1198303.
3,873,189.—ADJUSTABLE-POSITION OPTICAL SYSTEM. MAR. 25, 1975.

Class 17F 1

3,325,674.—MOVING TARGET DISPLAY INDICATOR. JUNE 13, 1967.
3,340,419.—ELECTRIC DISCHARGE TUBES. SEPT. 5, 1967. CAN. 0773690.
3,447,026.—CRT SCAN STABILIZER. MAY 27, 1969. GER. 1490986.
3,483,414.—STORG TUBE HVG FLD EFF LAYR W/ CONDCTG PINS EXT TO LAYR THAT READOUT NOT ERASE CHG PATTERN. DEC. 9, 1969. CAN. 0850846, GER. 1537566, GRB. 1203432, JAP. 0565841.

Class 17F 2

3,153,785.—TIME COMPRESSED DISPLAY. OCT. 20, 1964. CAN. 0708306, GRB. 1008993.
3,579,024.—SELECTIVE BLANKING CONTROL CIRCUIT. MAY 18, 1971.

Class 17G

3,619,714.—PANEL DISPLAY DEVICE. NOV. 9, 1971.
4,003,742.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. JAN. 18, 1977.

Class 17G 1

3,459,946.—SOLID STATE STORAGE DEVICE. AUG. 5, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,539,862.—DUAL CONDUCTOR STORAGE PANEL. NOV. 10, 1970. ARG. 0175067, AUS. 0414034, BEL. 0723721, CAN. 0878168, FRA. 1591040, GER. 1808238, GRB. 1235310, HOL. 0150616, ITL. 0847618, JAP. 0742515, MEX. 0111871, SPN. 0360366, STZ. 0493930, SWD. 0345341, VZL. 0023718.
4,002,998.—EXTERNALLY CONTROLLABLE MINIATURE LASERS. JAN. 11, 1977.
4,085,321.—MULTIPHASE PHOTOACTIVATED SWITCH. APR. 18, 1978.

Class 17G 2

3,531,647.—DEVICE AND PROCESS FOR REDUCTION OF BACKGROUND LIGHT IN SOLID STATE STORAGE PANELS. SEPT. 29, 1970. CAN. 0862333, FRA. 1540063, GER. 1549143, GRB. 1201375, ITL. 0818126, MEX. 0101197.
3,531,648.—SOLID STATE STORAGE PANEL FOR COLOR REPRODUCTION. SEPT. 29, 1970. CAN. 0846433, GRB. 1201377.
3,540,008.—SOLID STATE STORAGE DEVICES HAVING NON-CORONA EXTINCTION CAPABILITY. NOV. 10, 1970. ARG. 0166245, AUS. 0424286, BEL. 0725616, CAN. 0897827, FRA. 1599275, GER. 1815243, GRB. 1250023, ITL. 0849327, JAP. 0742516, MEX. 0106020, SPN. 0361652, STZ. 0504755, SWD. 0361123, VZL. 0023729.
3,561,964.—METHOD FOR PRODUCTION OF SOLID STATE STORAGE PANELS. FEB. 9, 1971. ARG. 0184633, AUS. 0427883, BEL. 0736077, CAN. 0866994, FRA. 6924001, GER. 1935763, GRB. 1270845, HOL. 0150271, ITL. 0870080, JAP. 0681942, MEX. 0113574, SPN. 0369656, STZ. 0513430, SWD. 0358991, VZL. 0023743.
3,594,610.—DISPLAY PANEL WITH CORONA DISCHARGE CONTROL. JULY 20, 1971.

Class 17G 3

3,154,636.—THREE DIMENSIONAL DISPLAY DEVICE. OCT. 27, 1964. CAN. 0794989, GRB. 1029611, JAP. 0462394.
3,205,403.—ELECTROLUMINESCENT DISPLAY SYSTEMS. SEPT. 7, 1965.
3,221,335.—ELECTRO-OPTICAL RECORDING AND VISUAL DISPLAY SYSTEMS. NOV. 30, 1965. AUS. 0226551, CAN. 0801882, FRA. 1202340, GER. 1107705, GRB. 0880692, JAP. 0306714.
3,989,355.—ELECTRO-OPTIC DISPLAY SYSTEM. NOV. 2, 1976.

Class 17G 4

3,293,441.—IMAGE INTENSIFIER WITH FERRO-ELECTRIC LAYER AND BALANCED IMPEDANCES. DEC. 20, 1966.

3,300,645.—FERROELECTRIC IMAGE INTENSIFIER INCLUDING INVERSE FEEDBACK MEANS. JAN. 24, 1967.
3,440,428.—IMAGE CONVERTER USING CHARGED PHOTOEMISSIVE LAYER. APR. 22, 1969. CAN. 0858119, GER. 1639462, GRB. 1202049, JAP. 0565839.
3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.
3,531,646.—ENHANCEMENT OF ELECTROSTATIC IMAGES. SEPT. 29, 1970. CAN. 0892186, GRB. 1199462, JAP. 0641476.
3,543,032.—DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE. NOV. 24, 1970. ARG. 0177440, CAN. 0880586, MEX. 0111518, PNM. 0001809, VZL. 0027508.

Class 17H

3,742,281.—CONTROLLED SPECTRUM FLASH LAMP. JUNE 26, 1973.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,995,110.—FLYING SPOT SCANNER WITH PLURAL LENS CORRECTION. NOV. 30, 1976.
4,021,845.—A LASER FOR GENERATING WHITE LIGHT. MAY 3, 1977. BEL. 0846954.
4,040,096.—FLYING SPOT SCANNER WITH RUNOUT CORRECTION. AUG. 2, 1977.
4,065,731.—TANDEM LASER ASSEMBLY. DEC. 27, 1977.
4,084,197.—FLYING SPOT SCANNER WITH SCAN DETECTION. APR. 11, 1978.
4,132,960.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. JAN. 2, 1979.

Class 17H 1

3,427,564.—HIGH-POWER IONIZED GAS LASER STRUCTURE. FEB. 11, 1969.
3,437,950.—ION LASER HAVING A METAL TUBE SHRINK-FITTED ONTO THE CERAMIC DISCHARGE TUBE. APR. 8, 1969.
3,523,256.—HEAT PUMPED LASER. AUG. 4, 1970.
3,529,261.—LASR HVNG ACTV MEDIUM WHCH IS AN EXCTD HALOGN WHSE LOWR ENRGY ST IS DEPLETD BY REACTNG W/ALKAL. SEPT. 15, 1970. CAN. 0816276, FRA. 1446601, GER. 1299367, GRB. 1124346, ITL. 0726918.
3,562,173.—LASER MATERIALS. FEB. 9, 1971.
3,860,888.—TIME-SHARING TWO FREQUENCY LASER. JAN. 14, 1975.
3,954,534.—LIGHT EMITTING DIODE ARRAY WITH DOME GEOMETRY. MAY 4, 1976.
3,969,686.—BEAM COLUMNATION USING MULTIPLE COUPLED ELEMENTS. JULY 13, 1976.
3,970,958.—ELECTRICALLY PUMPED SOLID-STATE DISTRIBUTED FEEDBACK LASER WITH PATICULAR GRATING SPACING. JULY 20, 1976. BEL. 0834484.
3,978,428.—BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. AUG. 31, 1976.
4,006,432.—INTEGRATED GRATING OUTPUT COUPLER IN DIODE LASERS. FEB. 1, 1977. BEL. 0834480.
4,023,993.—METHOD OF MAKING AN ELECTRICALLY PUMPED SOLID STATE DISTRIBUTED FEEDBACK LASER. MAY 17, 1977. BEL. 0832000, SPN. 0440361.
4,033,796.—METHOD OF MAKING BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. JULY 5, 1977.
4,045,749.—CORRUGATION COUPLED TWIN GUIDE LASER. AUG. 30, 1977.
4,052,680.—METAL VAPOR LASER HAVING CAPTAPHORESIS MEANS. OCT. 4, 1977.
4,063,189.—LEAKY WAVE DIODE LASER. DEC. 13, 1977.
4,099,999.—METHOD OF MAKING ETCHED-STRIPED SUBSTRATE PLANAR LASER. JULY 11, 1978.
4,105,954.—DOUBLE-CONFINED MULTIPLE ANODE HOLLOW CATHODE LASER. AUG. 8, 1978.
4,111,521.—SEMICONDUCTOR LIGHT REFLECTOR/LIGHT TRANSMITTER. SEPT. 5, 1978.
4,112,389.—DIODE LASER WITH RING REFLECTOR. SEPT. 5, 1978.
4,122,409.—METHOD AND APPARATUS FOR CONTROLLING THE INTENSITY OF A LASER OUTPUT BEAM. OCT. 24, 1978. BEL. 852044.
4,149,779.—INTERNAL LASER MIRROR ALIGNMENT FIXTURE. APR. 17, 1979.

Class 17H 2

3,296,541.—BROADBND TRVLNG WAVE MASER W/BOTH MASER AND ISOLATOR CRYSTALS CUT ATDFRNT ANGLES TO OPTICAL AXIS. JAN. 3, 1967.
3,983,509.—DISTRIBUTED FEEDBACK DIODE LASER. SEPT. 28, 1976.

Class 17H 3

3,258,597.—LASER HETERODYNE COMMUNICATION SYSTEM. JUNE 28, 1966.
3,465,166.—FAR INFRA-RED COHERENT LIGHT GENERATOR. SEPT. 2, 1969.
3,499,159.—POLYCHROMATIC LASER AEROSOL SIZING AND RANGING-PLASAR-TECHNIQUE. MAR. 3, 1970.
3,500,236.—LASER STABILIZING SYSTEM. MAR. 10, 1970.
3,534,289.—LASER SYSTEM WITH OPTICAL DISCRIMINATOR. OCT. 13, 1970.
3,753,144.—GAS LASER STRUCTURE. AUG. 14, 1973.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
4,012,776.—LUMINESCENT SCREEN LASER SCANNING TECHNIQUE. MAR. 15, 1977.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,100,408.—SIGNAL GENERATOR FOR RASTER TYPE SCANNERS. JULY 11, 1978.
4,106,844.—LASER SCANNING SYSTEM USING COMPUTER-GENERATED HOLOGRAMS. AUG. 15, 1978.
4,143,311.—HYSTERESIS SYNCHRONOUS MOTOR RATE SERVO SYSTEM. MAR. 6, 1979.

Class 17I

3,630,598.—OPTICAL DEMODULATION FILTER. DEC. 28, 1971. BEL. 0761134, CAN. 0904628, GRB. 1330709, ITL. 0914073, JAP. 0770139.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,687,535.—OPTICAL DEMODULATION SYSTEM. AUG. 29, 1972. BEL. 0762859, CAN. 0944075, FRA. 7105649, GRB. 1343483, ITL. 0918450.
3,689,267.—SCREEN MAKING PROCESS UTILIZING ROTATION OF OPTICAL PLATE. SEPT. 5, 1972. CAN. 0950736.
3,697,184.—APPARATUS FOR EVALUATING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1003484, GRB. 1389471.
3,776,995.—METHOD OF PRODUCING X-RAY DIFFRACTION GRATING. DEC. 4, 1973. CAN. 0944871, GRB. 1363262.
4,066,335.—VARIABLE DENSITY LENS. JAN. 3, 1978.

Class 17I 1

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.

Class 17I 2

3,416,865.—OPTICAL DENSITY MEASURING SYSTEM. DEC. 17, 1968.
3,609,047.—SINGLE BEAM PHOTOMETER SYSTEM WHEREIN THE ABSORBANCE OF A SAMPLE IS DETERMINED RELATIVE TO REFE. SEPT. 28, 1971.
4,054,391.—SPECULAR REFLECTANCE MICRODENSITOMETER. OCT. 18, 1977.

Class 17I 3

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
4,128,332.—ILLUMINATOR. DEC. 5, 1978. GRB. 1494424.

Class 17J

D.236,733.—CURSOR POSITION CONTROLLER. SEPT. 9, 1975.
3,447,030.—COLD SEAL LAMP PRESSURE REGULATION. MAY 27, 1969.
3,642,377.—COLOR PRINTING SYSTEM. FEB. 15, 1972.
3,733,123.—METHOD AND APPARATUS FOR ENCLOSING A LAMP. MAY 15, 1973. ARG. 0198292, AUS. 0466394, BEL. 0789338, FRA. 7234198, GRB. 1410046, ITL.

0967625, MEX. 0128585, SPN. 0409972, STZ. 0549825, SWD. 0360935.

3,775,006.—APPARATUS FOR OPTICAL COLOR SEPARATION. NOV. 27, 1973.

3,795,805.—APPARATUS FOR TESTING A CREDIT CARD. MAR. 5, 1974.

3,873,813.—CREDIT CARD. MAR. 25, 1975.

3,892,963.—TRANSDUCER FOR A DISPLAY-ORIENTED POINTING DEVICE. JULY 1, 1975. FRA. 7440265.

3,915,553.—ELECTROOPTIC COLOR FILTER SYSTEM. OCT. 28, 1975.

3,936,179.—SUPPORT STRUCTURE FOR A DUPLICATOR OPTICAL SYSTEM. FEB. 3, 1976.

3,951,521.—REVERSIBLE RADIANT ENERGY FILTER AND PROCESS OF USING SAME. APR. 20, 1976.

3,977,785.—METHOD & APP FOR INHIBITING THE OPERATION OF A COPYING MACHINE. AUG. 31, 1976.

4,071,323.—DIFFUSION CRUCIBLE AND SLAB MEMBER WITH COMMON METAL COMPONENT IN THE VAPOR PHASE. JAN. 31, 1978.

4,071,396.—CONTROLLED ATMOSPHERE PROCESS FOR ALTERING THE NONSTOICHIOMETRY OF CRYSTALLINE MEMBERS. JAN. 31, 1978.

Class 18

3,736,133.—TRANSPARENT INK - ABSORBENT LAQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583. GRB. 1390137, MEX. 0127276. VZL. 0033577.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.

3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.

3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.

4,080,332.—ELECTRICALLY CONDUCTIVE COMPOUNDS. MAR. 21, 1978.

Class 18A

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,402,177.—SUBSTITUTED 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRPOCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.

3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.

3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINOANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 1155986, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.

3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.

3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUCRESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965. JAP. 0586923.

3,562,248.—BISAZC FGMTS DRVD CPLRS CBTC CONDG 8-AMINO-2-NAPHTHOLS W/ DiCARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, JAP. 0683893, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651. VZL. 0029342.

3,694,201.—METHOD FOR PHOTOCONDUCTIVE POWDER. SEPT. 26, 1972. BEL. 0777717, CAN. 0982808, FRA. 7201003, GRB. 1381162, ITL. 0946352.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, CAN. 0995211, GRB. 1395769, ITL. 0955643, MEX. 0131970, VZL. 0034272.

3,837,850.—PHOTOCONDUCTIVE BUTILE TITANIUM DIOXIDE. SEPT. 24, 1974.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,905,958.—SELENIUM COMPOUNDS. SEPT. 16, 1975.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,047,947.—PROCESS FOR THE PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENI. SEPT. 13, 1977.

4,075,012..—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.

4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.

4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.

4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.

Class 18A 1

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MITS IN ELCPHG. JUNE 3, 1969.

3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.

3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

Class 18A 2

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.

3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.

3,509,146.—PROCESS OF PREPARING PHTHALOCYANINE AND HETEROCYCLIC ANALOGUES. APR. 28, 1970. CAN. 0865117, GRB. 1232241, JAP. 0587395.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PLD. 0082204, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

4,107,389.—FUSING SURFACE. AUG. 15, 1978. GRB. 1511272.

4,126,722.—FUSING SURFACE. NOV. 21, 1978. GRB. 1511272.

Class 18A 2A

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, JAP. 0820183, MEX. 0115884, VZL. 0024012.

3,862,127.—PROCESS. JAN. 21, 1975. AUS. 0453518, BEL. 0754407, FRA. 7028418, GRB. 1268574, ITL. 0929169, JAP. 0727963, SPN. 0382366.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

4,098,795.—METHOD FOR THE PREPARATION OF X-FORM METAL FREE PHTHALOCYAMINE. JULY 4, 1978. ARG. 182328, BEL. 737989, CAN. 899870, FRA. 6928871, GER. 1943381, GRB. 1280843, ITL. 870314, JAP. 654041, MEX. 116011.

Class 18A 3

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8, 13-DIOXODINAPHTHO-2-1-B, 2, 3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

Class 18A 4

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

Class 18B

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041. MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.

3,725,505.—PYRENE CONTAINING POLYMERS PREPARED BY ANIONIC POLYMERIZATION. APR. 3, 1973. ARG. 0183776, AUS. 0459733, BEL. 0770501, CAN. 0986650, FRA. 7127963, GRB. 1359045, ITL. 0930707, MEX. 0120152, SPN. 0393582, VZL. 0031959.

3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOROETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 7408936, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975. FRA. 7403086, GRB. 1446966.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,883,488.—2-VINYL-9-DICYANOMETHYLENE-FLUORENE AND DERIVATIVES THEREOF. MAY 13, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 099593, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382..

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975. ITL. 1010430.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,994,994.—IMPROVED PROCESS FOR PREPARATION OF BLOCK COPOLYMERS FROM VINYLCARBOZOLES & OTHER ADDITION MONO. NOV. 30, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,009,151.—POLYMERS OF 2-VINLYFLUORENONE AND DERIVATIVES THEREOF. FEB. 22, 1977.

4,011,266.—2-VINYL-FLUORENONE AND DERIVATIVES THEREOF. MAR. 8, 1977.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,071,670.—METHOD OF SIZING MONOMER DROPLETS FOR SUSPENSION POLYMERIZATION TO FORM SMALL PARTICLES. JAN. 31, 1978. BEL. 857223.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.
4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.
4,116,691.—ELECTROPHOTOGRAPHIC IMAGING MEMBER OF MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS. SEPT. 26, 1978.
4,122,113.—9-FLUORENYL ACRYLATES. OCT. 24, 1978.
4,129,581.—MONOMERS HAVING PENDANT ELECTRON ACCEPTOR GROUPS-PROCESS FOR PREPARATION AND USE. DEC. 12, 1978.
4,143,225.—HOMOPOLYMERS OF A FLUORENONE DERIVATIVE HAVING PENDANT ELECTRON ACCEPTOR GROUPS. MAR. 6, 1979.

Class 18C

4,074,143.—OPTOELECTRONIC DEVICE WITH OPTICAL FEEDBACK. FEB. 14, 1978. FRA. 7631992.

Class 18C 1

RE.27,480. —AUTOMATIC DEVELOPMENT CONTROLLER -RE OF 3,376,854-D986. SEPT. 19, 1972.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835. BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 18C 1A

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149. USR. 0460634, VZL. 0032423.
3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.
3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.
3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.
4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 18C 1B

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 0032708, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062. PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.
3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 33998, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.
3,653,893.—IMAGING SYSTEM. APR. 4, 1972.
3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.
3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.
3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.
3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977
4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.
4,147,541.—ELECTROSTATIC IMAGING MEMBER WITH ACID LUBRICANT. APR. 3, 1979. AUS. 467835. BEL. 802879. CAN. 995963. FRA. 7328588. GRB. 1437041. ITL. 991465. SPN. 417382. USR. 637099.

Class 18C 2

4,038,076.—ELECTROSTATOGRAPHIC DEVELOPMENT. JULY 26, 1977. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD 7216977.

Class 18C 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.
3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.
3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.
3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.
3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2A 2

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710. LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.
3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.
3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.
3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER

COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX EXPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155. SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 18C 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978. SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIER PARTICLES. AUG. 19, 1975. CAN. 1007923.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

4,019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977

4,040,969.—HIGH SURFACE AREA CARRIER. AUG. 9, 1977. BEL. 829639, GRB. 149,732, SPN. 438084.

4,042,517.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER. AUG. 16, 1977.

4,065,585.—RENEWABLE CHOW FUSER COATING. DEC. 27, 1977. GRB. 1490252.

4,066,563.—COPPER - TETRA - 4 - (OCTADECYLSULFONOM- IDO) PHTHALOCYANINE ELECTROPHOTOGRAPHIC CARRIER. JAN. 3, 1978.

4,122,024.—CLASSIFIED TONER MATERIALS. OCT. 24, 1978. BEL. 829719. CAN. 1043149. FRA. 7516758. GRB. 1497731.

4,126,454.—IMAGING PROCESS UTILIZING HIGH SURFACE AREA CARRIER MATERIALS. NOV. 21, 1978.

Class 18C 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

3,910,846.—METHOD OF PREPARING ELECTROSCOPIC TONER PARTICLES. OCT. 7, 1975. CAN. 0984074.

3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128768, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

4,161,454.—COATING MAGNETITE WITH POLYACID. JULY 17, 1979.

Class 18C 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.

3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

4,126,565.—TONERS FOR COLOR FLASH FUSERS CONTAINING A PERMANENT COLORANT AND A HEAT SENSITIVE DYE. NOV. 21, 1978.

Class 18C 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.
3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 18C 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.
3,790,485.—PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER. FEB. 5, 1974.
3,812,037.—LIQUID DEVELOPER COMPOSITION. MAY 21, 1974.

Class 18C 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.
3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 18C 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260. FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLTNG SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,936,517.—METHOD FOR REDUCING PARTICLE SIZE. FEB. 3, 1976.
4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.
4,071,670.—METHOD OF SIZING MONOMER DROPLETS FOR SUSPENSION POLYMERIZATION TO FORM SMALL PARTICLES. JAN. 31, 1978. BEL. 857223.
4,077,804.—METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS. MAR. 7, 1978.
4,097,620.—MAGNETIC TONER PARTICLE COATING PROCESS. JUNE 27, 1978.
4,142,981.—TONER COMBINATION FOR CARRIERLESS DEVELOPMENT. MAR. 6, 1979.
4,148,741.—POLYMERIZATION AND ATTRITION METHOD FOR PRODUCING TONER WITH REDUCED PROCESSING STEPS. APR. 10, 1979.

Class 18D

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,959,934.—COMPOSITION AND METHOD FOR REPAIRING SELENIUM PHOTORECEPTOR. JUNE 1, 1976.
3,971,169.—A METHOD FOR REPAIRING SELENIUM PHOTOCONDUCTORS. JULY 27, 1976.
4,062,658.—COMPOSITION & METHOD FOR REPAIRING SELENIUM PHOTORECEPTORS. DEC. 13, 1977.

Class 18E

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 20

3,916,167.—COUNTERS. OCT. 28, 1975.

Class 20A

3,751,693.—MOVING COIL MOTOR WITH NO SPRAY FLUX. AUG. 7, 1973. AUS. 3467604, BEL. 0795400, CAN. 0980395, GRB. 1424622, ITL. 0979062, SPN. 0411470.
3,769,467.—VIBRATION DAMPED TRANSDUCER HEAD ASSEMBLY. OCT. 30, 1973. ARG. 0195905, AUS. 0476996, BEL. 0795401, CAN. 0995355, GRB. 1417764, ITL. 0979063, MEX. 0135598, SPN. 0411538, STZ. 0558582, SWD. 7301915.
4,046,105.—LAMINAR DEEP WAVE GENERATOR. SEPT. 6, 1977.
4,076,417.—INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1604.

Class 20A 1

RE.27,313.—BELT TRACKING SYSTEM - RE OF 3,500,694-D2586. MAR. 21, 1972.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, USR. 0321984, VZL. 0023676.
3,500,694.—BELT TRACKING SYSTEM — SEE D3286 FOR RE27313. MAR. 17, 1970.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.

Class 20A 2

3,498,148.—CHAIN TRAIN. MAR. 3, 1970.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,844,179.—GEAR DRIVE FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. OCT. 29, 1974. ARG. 203483, BEL. 0816382, CAN. 1007075, GRB. 1467714, STZ. 5786990, VZL. 0033061.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976
3,985,277.—WEB HANDLING DEVICE. OCT. 12, 1976.
4,110,028.—DRIVE SYSTEM FOR MULTI-MODE REPRODUCING APPARATUS. AUG. 29, 1978. BEL. 844828.

Class 20A 3

3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,505,716.—ROLL APPARATUS. APR. 14, 1970.
3,791,243.—METHOD AND APPARATUS FOR FORMING EDGES OF AN ENDLESS BELT. FEB. 12, 1974.
3,932,177.—COLLAR AND METHOD OF MAKING SAME. JAN. 13, 1976.

Class 20A 4

3,329,029.—OFF-CENTER LOAD MOVING ASSEMBLY. JULY 4, 1967.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,777,578.—LINEAR ACTUATOR. DEC. 11, 1973. CAN. 9783901.

Class 20A 5

3,112,819.—CLUTCH MECHANISM - 914. DEC. 3, 1963. CAN. 0688810.
3,213,645.—TORQUE LIMITING MECHANISM. OCT. 26, 1965. CAN. 0729978, GRB. 1035547, JAP. 0548690.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.

3,686,974.—MECHANICAL DRIVE ARRANGEMENT. AUG. 29, 1972.

Class 20A 6

3,351,831.—MOTOR SPEED CONTROL UTILIZING LIGHT SENSITIVE CONDUCTIVE AND RESISTIVE ELEMENTS. NOV. 7, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,870,934.—WEB TENSION CONTROLLER. MAR. 11, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,917,400.—METHOD & APPARATUS FOR MAINTAINING A PREDETERMINED PHASE RELATIONSHIP BETWEEN TWO SIGNALS. NOV. 4, 1975.
3,921,043.—METHOD & APPARATUS FOR MAINTAINING SUBSTANTIALLY CONSTANT TORQUE IN A WEB TRANSPORT APPARATUS. NOV. 18, 1975.
3,944,896.—PHASE SYNCHRONIZATION SYSTEM WITH START-UP SEQUENCING AND AUTOMATIC SHUTDOWN. MAR. 16, 1976.
3,991,355.—STEPPER MOTOR CONTROL NOV. 9, 1976.
4,110,028.—DRIVE SYSTEM FOR MULTI-MODE REPRODUCING APPARATUS. AUG. 29, 1978. BEL. 844828.

Class 20B

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.

Class 20B 1

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

Class 20B 2

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,477,568.—ELECTROSTATIC SEPARATION OF ROUND AND NONROUND PARTICLES. NOV. 11, 1969.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,694,068.—ROLLER RETRACTION MECHANISM IN A MULTIPLE ROLLER BELT ASSEMBLY. SEPT. 26, 1972. CAN. 0946322, GRB. 1370798.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.
3,702,131.—BELT TRACKING SYSTEM. NOV. 7, 1972. ARG. 1949380, AUS. 0459379, BEL. 0777321, CAN. 0953673, FRA. 7147892, GRB. 1381720, ITL. 0944435, MEX. 0126336, PNM. 0002633, SPN. 0398380.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 20B 3

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,662,884.—METHOD AND APPARATUS FOR ELECTROSTATICALLY CLASSIFYING TONER PARTICLES. MAY 16, 1972. CAN. 0956273, GRB. 1327942.
3,740,735.—AIR CIRCULATION APPARATUS. JUNE 19, 1973. CAN. 1014265, GRB. 1322612, JAP. 0840915.
3,909,383.—CLEANING PROCESS. SEPT. 30, 1975. CAN. 0905883.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20 C

3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.

Class 20C 1

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

Class 20C 2

3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,723,980.—TEMPERATURE COMPENSATION SYSTEM FOR MAGNETIC DISK MEMORY UNIT. MAR. 27, 1973. ARG. 0195985, AUS. 0471633, BEL. 0791363, FRA. 7240560, GRB. 1408778, ITL. 0970913, MEX. 0129694, SPN. 0408629, STZ. 0028456, SWD. 7214693, VZL. 0032424.

Class 20C 3

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

Class 20C 4

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
4,138,635.—ALTERNATING CURRENT GENERATOR USING LIGHT DEPENDENT RESISTOR. FEB. 6, 1979.

Class 20C 5

3,216,247.—WIND-MEASURING METER DEVICE. NOV. 9, 1965.

Class 20C 6

3,502,163.—EQUAL ARM BALANCE WITH C-SHAPED FULCRUM SLEEVE FORMED ON BEAM. MAR. 24, 1970.
3,583,505.—SPRING SCALE. JUNE 8, 1971. CAN. 0902123, GRB. 1295477.
3,878,358.—DIGITAL POWER CONTROL. APR. 15, 1975.

Class 20C 7

3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

Class 20D

3,746,502.—EVAPORATION CRUCIBLE. JULY 17, 1973. GRB. 1411236.
3,765,638.—SUCTION MOUNT. OCT. 16, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

Class 20D 1

3,379,855.—FLUID FEED SYSTEM. APR. 23, 1968.
3,407,018.—TWO-AXIS ANGULAR POSITIONING APPARATUS FOR ADJUSTING THE POSITION OF AN OPTICAL ELEMENT. OCT. 22, 1968.
3,436,071.—WORK HOLDER. APR. 1, 1969. CAN. 0856095, GRB. 1174795, JAP. 0642773.
3,440,859.—CORNER FORMING APPARATUS. APR. 29, 1969. CAN. 0866532.
3,475,936.—TRANSPORT SYSTEM. NOV. 4, 1969. GRB. 1179749.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,901,647.—LOW RADIATION OPEN-BOAT CRUCIBLES. AUG. 26, 1975.
4,016,470.—TRANSDUCER BORING SYSTEM. APR. 5, 1977.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.
4,143,960.—RETRACTABLE SUPPORT MEMBER. MAR. 13, 1979.

Class 20D 2

3,056,967.—FASTENER DRIVING TOOL. OCT. 9, 1962.
3,091,578.—MECHANICAL BONDING LOCK. MAY 28, 1963.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,876,317.—LATCH MECHANISM. APR. 8, 1975. CAN. 1005486.

Class 20D 3

3,258,281.—HERMETIC SEALED COUPLING FOR CONDUITS. JUNE 28, 1966.
3,317,224.—FLANGED PIPE COUPLING HAVING METALLIC SEAL MEANS. MAY 2, 1967.
3,366,343.—DEVICE FOR FASTENING A SHAFT TO A REEL. JAN. 30, 1968.
3,604,737.—METHOD OF JOINING MATERIALS. SEPT. 14, 1971.

Class 20D 4

3,532,863.—DYNAMIC CAM TESTER. OCT. 6, 1970. CAN. 0835529.
3,843,233.—ALIGNING AGENT FOR LOWRNG THRSHLD VOLTG REQUIRD TO EFFECT OPTCLY NEQTV TO OPTCLY POSITIVE PHASE. OCT. 22, 1974.

Class 20D 5

3,596,316.—BLOW MOLDING APPARATUS. AUG. 3, 1971.

Class 20D 6

3,384,107.—BAKEABLE VACUUM VALVE. MAY 21, 1968.

Class 20D 7

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

Class 20E

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.

Class 20F

3,390,693.—PURE FLUID AMPLIFIER. JULY 2, 1968.
3,413,993.—FLUID DEVICE. DEC. 3, 1968.
3,417,770.—FLUID AMPLIFIER SYSTEM. DEC. 24, 1968.
3,459,205.—MAGNETICALLY CONTROLLED FLUID AMPLIFIER. AUG. 5, 1969.
3,496,955.—ELECTRICALLY ACTUATED BISTABLE FLUID AMPLIFIER. FEB. 24, 1970.
3,726,588.—WEB TRACKING SYSTEM. APR. 10, 1973.

Class 20 G

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.
3,549,059.—TRIGGERING APPARATUS AND WORK LOCATING MEANS FOR AEROSOL SPRAY CANS. DEC. 22, 1970.
3,555,725.—SELF-TRAVELLING WHEEL. JAN. 19, 1971. CAN. 0900718, GRB. 1289331, JAP. 0713807.
3,688,415.—VIBRATION DEMONSTRATION. SEPT. 5, 1972.
3,747,589.—REACTION TIME TESTING APPARATUS. JULY 24, 1973.
3,818,391.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATOGRAPHIC MACHINE. JUNE 18, 1974. CAN. 1010107.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
3,941,006.—FREE FLOATING BELT TENSIONER. MAR. 2, 1976.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,982,753.—COMBINED BACKSTOP & BRAKE-COMBINED BACKSTOP & BRAKE FOR ALBERT. SEPT. 28, 1976. BEL. 0812180, CAN. 1004161, FRA. 7407806, GRB. 1443088.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.
4,040,157.—DRUM SUPPORT APPARATUS. AUG. 9, 1977.
4,040,678.—BEARING ASSEMBLY. AUG. 9, 1977.
4,105,345.—EXPANDABLE PHOTORECEPTOR ENDBELLS. AUG. 8, 1978.
4,120,576.—DRUM SUPPORT APPARATUS. OCT. 17, 1978.
4,135,805.—COUNTERBALANCING APPARATUS. JAN. 23, 1979.
4,143,960.—RETRACTABLE SUPPORT MEMBER. MAR. 13, 1979.

Class 21

D.240,557.—TRAY RACK. JULY 13, 1976.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
D245,667.—WIRE CUTTER. SEPT. 6, 1977.

Class 21A

3,905,400.—ELECTROFORMING MANDREL. SEPT. 16, 1975.
4,067,782.—METHOD OF FORMING AN ELECTROFORMING MANDREL. JAN. 10, 1978.

Class 21A 1

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,505,177.—ELECTROFORMING PROCESS. APR. 7, 1970.
3,520,780.—MAGNESIUM ELECTRODEPOSITION. JULY 14, 1970.
3,844,906.—DYNAMIC BATH CONTROL PROCESS. OCT. 29, 1974. BEL. 0799236, FRA. 7316539, GRB. 1421818.
3,853,614.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. DEC. 10, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,876,510.—PROCESS FOR ELECTROFORMING A FLEXIBLE BELT. APR. 8, 1975.
3,905,685.—ZOOM LENS FOR FIXED CONJUGATES. SEPT. 16, 1975. CAN. 0995039, GRB. 1451781.
3,954,568.—ELECTROFORMING AN ENDLESS FLEXIBLE SEAMLESS XEROGRAPHIC BELT. MAY 4, 1976. ARG. 0185811, AUS. 0449005, BEL. 0762249. CAN. 0889781, EGR. 0094306, FRA. 7103844, GRB. 1288717, HUN. 0169866, ITL. 0918048, MEX. 0119465, PLD. 0081712, PNM. 0002384, SPN. 0387636, STZ. 0521612, SWD. 0360753, TIW. 0007843, VZL. 0027666.
3,959,109.—METHOD AND APPARATUS FOR ELECTROFORMING. MAY 25, 1976.
3,963,587.—PROCESS FOR ELECTROFORMING NICKEL FOILS. JUNE 15, 1976.
4,043,876.—METHOD AND APPARATUS FOR ELECTROFORMING. AUG. 23, 1977.

Class 21A 2

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,577,323.—HIGH QUALITY SUBMASTERS. MAY 4, 1971.
3,927,463.—METHOD OF MAKING A CYLINDRICALLY SHAPED, HOLLOW ELECTROFORMING MANDREL. DEC. 23, 1975.
3,950,839.—ELECTROFORMING MANDREL. APR. 20, 1976.

Class 21A 3

3,352,482.—ION SPUTTER PUMPING COLLECTOR. NOV. 14, 1967.

3,437,568.—APPARATUS AND METHOD FOR DETERMINING AND CONTROLLING STRESS IN AN ELECTROFORMED PART. APR. 8, 1969.
3,799,859.—ELECTROFORMING SYSTEM. MAR. 26, 1974. GRB. 1427544.
4,043,876.—METHOD AND APPARATUS FOR ELECTROFORMING. AUG. 23, 1977.

Class 21B

3,223,878.—METHOD OF FABRICATING FINE GRIDS. DEC. 14, 1965.
3,276,919.—PROCESS FOR FORMING METAL STRUCTURES HAVING VERY FINE PORES. OCT. 4, 1966.
3,360,347.—PRODUCTION OF POUROUS MATERIALS. DEC. 26, 1967.
3,494,748.—OXIDATION RESISTANT COATING AND ARTICLE. FEB. 10, 1970.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,703,306.—METHOD OF HERMETICALLY SEALING SILICON TO A LOW EXPANSION ALLOY. NOV. 21, 1972.
3,740,830.—BRAZING CERAMICS. JUNE 26, 1973.
3,825,724.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER. JULY 23, 1974. CAN. 0995295, GRB. 1406047.
3,851,985.—COLLAR AND METHOD OF MAKING SAME. DEC. 3, 1974.
3,885,923.—GENERATION OF CURVED SURFACES ON A WORKPIECE. MAY 27, 1975.
3,911,163.—SOLDER COATING PROCESS AND APPARATUS. OCT. 7, 1975.
4,083,323.—PNEUMATIC SYSTEM FOR SOLDER LEVELING APPARATUS. APR. 11, 1978.
4,114,431.—METHOD OF FORMING TUBULAR METAL PRODUCTS. SEPT. 19, 1978.

Class 21C

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.
4,112,841.—RESILIENT LITHOGRAPHIC MASTERS FOR DIRECT PRINTING. SEPT. 12, 1978.
4,114,535.—RESILIENT LITHOGRAPHIC MASTERS FOR DIRECT PRINTING. SEPT. 19, 1978.
4,123,283.—SETTING ELECTRICAL LATENT IMAGES IN MIGRATION IMAGING ELEMENTS. OCT. 31, 1978. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.
4,135,926.—MIGRATION IMAGING PROCESS IN WHICH LATENT IMAGE IS SET. JAN. 23, 1979. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

Class 22

D244,280.—SORTER WITH BIN INDICATOR. MAY 10, 1977.
D247,243.—SORTER CONTROLLER. FEB. 14, 1978.
D.252,275.—SUBSTRATE CLAMP FOR A SLITTING APPARATUS. JULY 3, 1979.

Class 22A

3,473,388.—ISOKINETIC PARTICLE SAMPLER. OCT. 21, 1969. CAN. 0852475, GRB. 1194569.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. CAN. 0888335.
3,940,997.—APPARATUS AND METHOD FOR MEASURING ANGLE OF REPOSE. MAR. 2, 1976.

Class 22B

3,938,993.—XEROGRAPHIC METHOD FOR MAKING A RESPONSIVE ANSWER SYSTEM. FEB. 17, 1976. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,972,715.—PARTICLE ORIENTATION IMAGING SYSTEM. AUG. 3, 1976.

Class 22B 1

3,497,320.—AUTOMATED CHEMICAL ANALYZER FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1A

3,477,821.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169582, AUS. 0433117, BEL. 0725955, CAN. 0876261, FRA. 1596338, GER. 1816225, GRB. 1245780, HOL. 0141402, ITL. 0852626, JAP. 0805178, MEX. 0108467. PNM. 0001764, SPN. 0361841, STZ. 0531895, SWD. 0345742, VZL. 0023719.
3,477,822.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169541, AUS. 0433116, BEL. 0725958, CAN. 0904725, FRA. 1596340, GRB. 1251680, HOL. 0141098, ITL. 0852625, JAP. 0802751, MEX. 0108998, PNM. 0001662, SPN. 0361844, STZ. 0530223, SWD. 0346384, VZL. 0023725.
3,480,398.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169487, AUS. 0433114, BEL. 0725956, CAN. 0885006, FRA. 1596337, GER. 1816228, GRB. 1257336, HOL. 0141797, ITL. 0856875, JAP. 0805177, MEX. 0108468, PNM. 0001663, SPN. 0361842, STZ. 0530637, SWD. 0345012, VZL. 0023722.
3,480,399.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169540, AUS. 0433115, BEL. 0725957, CAN. 0906891, FRA. 1596339, GER. 1816227, GRB. 1251679, HOL. 0141099, ITL. 0852624, JAP. 0802750. MEX. 0108997, PNM. 0001669, SPN. 0361843, STZ. 0526106, VZL. 0023720.
3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,545,934.—CHEMICAL PACKAGE. DEC. 8, 1970. BEL. 0739751, CAN. 0887759. FRA. 6933737, GER. 1950067, GRB. 1257337, HOL. 150690, ITL. 0873750.
3,545,935.—DISPOSABLE REACTION CONTAINER FOR AN AUTOMATIC CHEMICAL ANALYZER. DEC. 8, 1970. ARG. 0179456, AUS. 0447958, BEL. 0741890, CAN. 0933494, FRA. 6959709, GER. 1957735, GRB. 1257338, HOL. 0145773, ITL. 0878322, MEX. 0113681, SPN. 0373794, STZ. 0500010, SWD. 0353399.
3,554,705.—CHEMICAL PACKAGE. JAN. 12, 1971.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.
3,582,285.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1B

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952,

FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.

3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.

3,586,446.—FLAME PHOTOMETER. JUNE 22, 1971. ARG. 0183956, BEL. 0720577, CAN. 0876239, FRA. 1581844, GER. 1798234, GRB. 1246633, ITL. 0864506, JAP. 0835088, MEX. 0103300, SWD. 0342326, VZL. 0023659.

Class 22B 2

3,497,320.—AUTOMATED CHEMICAL ANALYZER FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336. ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,520,659.—METHOD AND APPARATUS FOR USE IN DETERMINING PROTHROMBIN TIME OF A BLOOD SAMPLE. JULY 14, 1970. ARG. 0176972, AUS. 0421560, BEL. 0722360, CAN. 0892696, FRA. 1588701, GER. 1804292, GRB. 1244355, HOL. 0142783, ITL. 0862597, MEX. 0105611, SPN. 0359312, SWD. 0345744, VZL. 0023706.

3,705,013.—ANALYTICAL PROCEDURES AND COMPOSITIONS THEREFOR. DEC. 5, 1972.

Class 24

D.249,695.—REMOVABLE UNDERSIZE SHEET EDGE GUIDE SHEET FEED CASSETTE. SEPT. 26, 1978.

3,888,892.—LIQUID CRYSTALLINE COMPOUNDS. JUNE 10, 1975.

4,126,711.—CHARGE PATTERN DEVELOPMENT METHOD & APPARATUS. NOV. 21, 1978. GRB. 1484712.

Class 24A 1

3,289,211.—ELECTRICAL RECORDING PEN. NOV. 29, 1966. ARG. 0144972, AUS. 0283737, BEL. 0663614, CAN. 0755964. FRA. 1444045, GER. 1498264, GRB. 1064344, HOL. 0145955, ITL. 0760432, JAP. 0704598, MEX. 0084384, NOR. 0121120, NZL. 0141445, SPN. 0312594, STZ. 0430241, SWD. 0336857, VZL. 0017268.

3,308,475.—ELECTROVISCOUSLY CONTROLLED RECORDER. MAR. 7, 1967.

3,359,566.—MOTOR ACTION CAPILLARY. DEC. 19, 1967. CAN. 0831673, GER. 1537562, GRB. 1196932, JAP. 0583415.

3,375,528.—RECORDING PEN HAVING A PLURALITY OF CLOSELY SPACED WIRES. MAR. 26, 1968. AUS. 0284067, BEL. 0680693, CAN. 0834975, FRA. 0089948, GER. 1548876, GRB. 1148771, HOL. 0150907, ITL. 0809504, JAP. 0773176, MEX. 0091261, SPN. 0326324, STZ. 0457888, SWD. 0325719.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,512,173.—ALPHANUMERIC INK DROPLET RECORDER. MAY 12, 1970. ARG. 0180676, BEL. 0725960, CAN. 0879917, FRA. 1603645, GER. 1816194, GRB. 1227600, ITL. 0849703, JAP. 0770832, MEX. 0109982.

3,512,177.—INK RECORDING SYSTEM. MAY 12, 1970.

3,848,258.—MULTI-JET INK PRINTER. NOV. 12, 1974. BEL. 0819105, CAN. 1000778, FRA. 7419592.

3,893,131.—INK PRINTER. JULY 1, 1975. BEL. 0819105, CAN. 1000778, FRA. 7419592.

4,014,693.—ELECTROVISCOUS RECORDING. MAR. 29, 1977.

Class 24A 2

3,329,964.—FACSIMILE RECORDING APPARATUS. JULY 4, 1967. CAN. 0809338, GRB. 1095098.

3,334,354.—DOTTING INK RECORDER. AUG. 1, 1967. CAN. 0792422.

3,627,908.—HIGH-SPEED COLOR CORRECTING SCANNER FOR MAKING COLOR PRINTING PLATES. DEC. 14, 1971. CAN. 0923428, GRB. 1335980, JAP. 0774708.

4,024,544.—MENISCUS DAMPENING DROP GENERATOR. MAY 17, 1977.

4,032,929.—HIGH DENSITY LINEAR ARRAY INK JET ASSSEMBLY. JUNE 28, 1977.

4,057,807.—SEPARABLE LIQUID DROPLET INSTRUMENT AND MAGNETIC DRIVER THEREFOR. NOV. 8, 1977.

4,104,645.—COINCIDENCE INK JET. AUG. 1, 1978. SAF. 6469.

4,112,433.—MENISCUS DAMPENING DROP GENERATOR. SEPT. 5, 1978. STZ. 609915.

4,115,789.—SEPARABLE LIQUID DROPLET INSTRUMENT AND PIEZOELECTRIC DRIVERS THEREFOR. SEPT 19, 1978. BEL. 850334.

4,121,227.—INK JET ARRAY WITH ISOLATED FLUID RECTIFIER LAYERS. OCT. 17, 1978.

Class 24A 3

3,287,734.—MAGNETIC INK RECORDING. NOV. 22, 1966. CAN. 0808834, FRA. 1490442, GRB. 1102505, HOL. 0150643, ITL. 0784569, JAP. 0571140.

3,334,000.—METHOD FOR SIMULTANEOUS PRODUCTION OF A PLURALITY OF MICROCIRCUIT WAFERS. AUG. 1, 1967.

Class 24A 4

3,480,962.—FACSIMILE RECORDING SYS. NOV. 25, 1969.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,484,793.—IMAGE RECORDING APPARATUS INK DROPLET RECORDER WITH OPTICAL INPUT. DEC. 16, 1969.

3,553,708.—APPARATUS AND METHOD EMPLOYING PHOTOELECTROVISCOUS INK. JAN. 5, 1971.

Class 24B

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

4,080,054.—DEVICE FOR REPLENISHING TONER PARTICLES. MAR. 21, 1978.

4,096,294.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND CRYST. JUNE 20, 1978.

Class 24B 1

3,833,293.—METHOD OF CREATING COLOR TRANSPARENCIES. SEPT. 3, 1974.

4,047,947.—PROCESS FOR THE PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENI. SEPT. 13, 1978.

4,055,424.—NOVEL MICROFILM AND PROCESS FOR PREPARATION. OCT. 25, 1977.

Class 24B 1A

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

Class 24B 1B 1

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458. ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

Class 24B 1B 3

3,459,888.—SELECTIVE PHOTOCOPIER. AUG. 5, 1969.

3,537,788.—AUTOMATIC DISCRIMINATION TECHNIQUE FOR SELECTIVE PHOTOCOPYING. NOV. 3, 1970.

Class 24B 1C

3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

3,480,965.—APPARATUS FOR PYROGENICALLY RECORDING ON TRANSPARENCIES. NOV. 25, 1969.

Class 24B 1D

3,435,243.—FILM FRAME DETECTION SYSTEM. MAR. 25, 1969.

Class 24B 2A

3,349,980.—VACUUM TRANSPORT DEVICE. OCT. 31, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.

Class 24B 2B

3,409,364.—GATE ASSEMBLY. NOV. 5, 1968.
3,409,365.—CONTACT PRINTER. NOV. 5, 1968. AUS. 0425973, JAP. 0613746.

Class 24B 2C

3,379,110.—EXPOSURE CONTROL SYSTEM. APR. 23, 1968.
3,479,119.—EXPOSURE CONTROL APPARATUS. NOV. 18, 1969.

Class 24B 4

3,510,216.—PROJECTION APPARATUS. MAY 5, 1970.

Class 24C

4,007,682.—REVERSE ANGLE MOUNTED INK-SPLITTING DOCTOR BLADE. FEB. 15, 1977.

Class 24C 1

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

Class 24C 1A

3,170,395.—DUPLICATING. FEB. 23, 1965. AUS. 0410880, CAN. 0768079, FRA. 1414985, GRB. 1059659, ITL. 0740682, JAP. 0511405.
3,332,347.—DUPLICATING. JULY 25, 1967. AUS. 0271226, CAN. 0761868, FRA. 1367474, GER. 1471696, GRB. 1029997, ITL. 0730203.
3,357,353.—VAPOR THERMOGRAPHY RECORDING PROCESS AND RECORDING MEMBER USED THEREIN. DEC. 12, 1967.

Class 24C 1B

3,336,867.—DUPLICATING PROCESS. AUG. 22, 1967. CAN. 0796971, GRB. 1149056.

Class 24C 1C

3,487,775.—IMAGING SYSTEM. JAN. 6, 1970. CAN. 0873983.

Class 24C 1D

3,408,216.—IMAGE REPRODUCTION. OCT. 29, 1968. CAN. 0806942, GRB. 1127218, JAP. 0742511.
3,792,266.—THERMOGRAPHIC RECORDING USING VAPORIZED MATERIAL AND COLORED PARTICLE DEVELOPMENT. FEB. 12, 1974.

Class 24C 1E 1

3,402,660.—DRUM SUPPORT AND DRIVE SYSTEM FOR REPRODUCTION MACHINES. SEPT. 24, 1968.
3,427,965.—SHEET GRIPPER MEANS FOR REPRODUCTION MACHINE OF THE PRESSURE TRANSFER TYPE. FEB. 18, 1969.
3,429,259.—PRESSURE TRANSFER REPRODUCTION MACHINE. FEB. 25, 1969.
3,460,472.—TRANSFER SHEET CLAMPING MECHANISM FOR A REPRODUCTION MACHINE. AUG. 12, 1969.

Class 24C 1E 2

3,433,154.—PRESSURE PRODUCING MEANS FOR REPRODUCTION MACHINE. MAR. 18, 1969.

Class 24C 1E 3

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,380,379.—SHEET GUIDING MECHANISM FOR A REPRODUCTION MACHINE. APR. 30, 1968.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,427,966.—PRESSURE TRANSFER TYPE REPRODUCTION MACHINE. FEB. 18, 1969.
3,430,558.—SHEET COUNTING SYSTEM IN A REPRODUCTION MACHINE. MAR. 4, 1969.

Class 24C 1E 4

3,375,779.—PROGRAMMING CONTROL FOR REPRODUCTION MACHINES. APR. 2, 1968.

Class 24C 1E 5

3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.
3,093,068.—METHOD AND APPARATUS FOR PATTERN REPRODUCTION. JUNE 11, 1963. CAN. 0624373.
3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,681,065.—DYE TRANSFER COLOR PHOTOGRAPHY. AUG. 1, 1972.

Class 24C 1E 6

3,527,163.—SILK SCREEN MASTER. SEPT. 8, 1970.

Class 24C 1E 7

3,357,354.—REPRODUCTION METHOD. DEC. 12, 1967.
3,406,137.—IMAGING MATERIAL. OCT. 15, 1968. AUS. 0409415, BEL. 0680375, CAN. 0815085, FRA. 1477912, GER. 1571874, GRB. 1149055, ITL. 0766799, JAP. 0594685, MEX. 0090845, SWD. 0336860.
3,415,186.—DUPLICATING SYSTEM. DEC. 10, 1968.
3,436,234.—DUPLICATING INK. APR. 1, 1969. AUS. 0408998, BEL. 0680377, CAN. 0806568, FRA. 1477914, GER. 1571875, GRB. 1151495, ITL. 0765635, JAP. 0594687, MEX. 0090362, SWD. 0336421.
3,446,646.—PRESSURE SENSITIVE RECEIVING AND TRANSFER SHEET. MAY 27, 1969. AUS. 0417562, BEL. 0680376, CAN. 0865673, FRA. 1477913, GER. 1571922, GRB. 0115076, ITL. 0765634, JAP. 0575982, MEX. 0090589, SWD. 0333578.

Class 24D

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,422,759.—LITHOGRAPHIC IMAGING SYSTEM USING PHOTOCHROMIC AND THERMOCHROMIC MATERIALS. JAN. 21, 1969. CAN. 0855648, GRB. 1190102.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794. VZL. 0024009.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,718,087.—APPARATUS FOR APPLYING INK AND IMMISSIBLE FLUID TO A PRINTING SURFACE. FEB. 27, 1973. ARG. 0185945, AUS. 0449639, BEL. 0759110, CAN. 0919007, FRA. 7042608, GRB. 1330183, ITL. 0912865, MEX. 0120782.
3,878,168.—SILICONE ELASTOMERS. APR. 15, 1975.
3,901,151.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. AUG. 26, 1975.
3,907,562.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. SEPT. 23, 1975.
3,909,256.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING SCREEN PRINTING MEMBER. SEPT. 30, 1975.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.
3,948,655.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING GRAVURE PRINTING MEMBER. APR. 5, 1976.
3,951,060.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,951,063.—PROCESS FOR PREPARING REVERSIBLE CURE WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,957,349.—IMAGING METHOD. MAY 18, 1976.
3,961,947.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. JUNE 8, 1976.
3,968,278.—IMAGING METHOD. JULY 6, 1976.
3,971,316.—PROCESS FOR SMOOTHING WATERLESS LITHOGRAPHIC MASTERS. JULY 27, 1976.
3,995,554.—PROCESS FOR PREPARING RESILIENT IMAGED PRINTINGS MASTERS. DEC. 7, 1976.
3,999,481.—METHOD OF MAKING A MASTER. DEC. 28, 1976.
4,003,312.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC PRINTING MASTERS BY INK JET PRINTING MEANS. JAN. 18, 1977.
4,005,654.—PROCESS FOR SHALLOW RELIEF PRINTING. FEB. 1, 1977. BEL. 0792620, FRA. 7244602, GRB. 1416158, ITL. 0971749.
4,007,041.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.
4,009,032.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND THERMOPLA. FEB. 22, 1977.
4,009,660.—INKING IN LITHO PRINTING THROUGH A NON-IMAGED SCREEN. MAR. 1, 1977.
4,010,687.—PLANOGRAPHIC PRINTING MASTER-MULTI PHASE TONERS & MULTI PHASE ADHESIVE LAYERS. MAR. 8, 1977. BEL. 0813293, CAN. 0988364, GRB. 1458725, ITL. 1006438, PTG. 61726.
4,012,254.—NOVEL PHOTOCONDUCTIVE WATERLESS LITHOGRAPHIC PRINTING MASTERS & PROCESS OF PREPARATION. MAR. 15, 1977.
4,016,814.—PLANOGRAPHIC PRINTING MASTER — SPONGY IMAGE PATTERNS. APR. 12, 1977. CAN. 0985952, ITL. 1006441.
4,019,437.—PLANOGRAPHIC PRINTING MASTER TONER INDUCED POROUS SPONGE IMAGES TIPSI. APR. 26, 1977. BEL. 0813159, CAN. 1014416, GRB. 1458723, ITL. 1006440, NZL. 0173942.
4,030,416.—WATERLESS PRINTING MASTER. JUNE 21, 1977.
4,064,312.—NONIMAGED WATERLESS LITHOGRAPHIC MASTER WITH CURABLE SILICONE ELASTOMER AND A CURED INK REL. DEC. 20, 1977.
4,077,324.—METHOD OF FOUNTAINLESS LITHOGRAPHY. MAR. 7, 1978. FRA. 7520962.
4,077,325.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS. MAR. 7, 1978.
4,078,927.—PHOTOCONDUCTIVE PRINTING MASTER. MAR. 14, 1978.
4,080,897.—SELECTIVE TACK IMAGING AND PRINTING. MAR. 28, 1978.
4,081,572.—PREPARATION OF HYDROPHILIC LITHOGRAPHIC PRINTING MASTERS. MAR. 28, 1978.
4,077,073.—PROCESS FOR PREPARING INK RELEASING STENCIL. MAY 9, 1978.
4,097,138.—PHOTOCONDUCTIVE BELT INCREMENTING APPARATUS. JUNE 27, 1978.
4,100,135.—NOVEL ELASTOMERS AND IMPROVED WATERLESS LITHOGRAPHIC PRINTING MASTERS. JULY 11, 1978.
4,103,616.—ELASTOMERS AND IMPROVED WATERLESS LITHOGRAPHIC PRINTING MASTERS. AUG. 1, 1978.

Class 24E

3,315,602.—FORMING OF PRINTING PLATES. APR. 25, 1967. CAN. 0852683, GER. 1267227, GRB. 1132071, JAP. 0532965.
3,443,517.—ELECTROSTATIC DUPLICATION SYSTEM EMPLOYING RELIEF PRINTING PLATE. MAY 13, 1969. CAN. 0873982, GRB. 1212370, JAP. 0641477.
3,456,586.—PROCESS FOR MAKING AND USING A RELIEF PRINTING MASTER. JULY 22, 1969.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,957,348.—METHOD FOR ALTERING ELLIPTICALLY POLARIZED LIGHT. MAY 18, 1976.
3,964,907.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. JUNE 22, 1976.
4,017,581.—PROCESS FOR PREPARING PRINTING MASTERS & MOLDS. APR. 12, 1977.

Class 24F

3,445,226.—FROST GRAVURE PRINT MASTER. MAY 20, 1969. CAN. 0842443, FRA. 1480896, GRB. 1136029, ITL. 0771305, JAP. 0605647, MEX. 0093298.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,561,358.—GRAVURE IMAGING SYSTEM. FEB. 9, 1971. CAN. 0908257, GRB. 1201819, JAP. 0594737.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,801,315.—GRAVURE IMAGING SYSTEM. APR. 2, 1974. CAN. 0991245, GRB. 1411237.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 24G

3,565,978.—REPLICATION OF SURFACE DEFORMATION IMAGES. FEB. 23, 1971. AUS. 0417038, BEL. 0710829, CAN. 0879916, FRA. 1583418, GER. 1621783, GRB. 1221342, ITL. 0863054, MEX. 0096672.
3,592,114.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. JULY 13, 1971.
3,678,850.—POROUS PRINTING PLATE PREPARED FROM PARTICULATE PHOTOSENSITIVE RESINOUS MATERIAL. JULY 25, 1972. CAN. 0844327, GRB. 1188376, JAP. 0635879.
4,059,554.—STABILIZE EMULSION INKS. NOV. 22, 1977.
4,068,588.—PRINTING USING AN ELECTROCHROMIC IMAGE. JAN. 17, 1978.
4,093,371.—COMPOSING MACHINE. JUNE 6, 1978.

Class 25

3,692,659.—ELECTROLYTIC REVERSIBLE COLOR DISPLAY DEVICE. SEPT. 19, 1972. CAN. 0932427, GRB. 1356187.
4,056,822.—LOW PROFILE SINGLE CHANNEL THERMAL ANALOG RECORDER. NOV. 1, 1977.
4,056,823.—ANALOG CHART RECORDER EMPLOYING THERMAL PRINTING MEANS. NOV. 1, 1977.
4,099,071.—MONOLITHIC ELECTRONIC SCANNING DEVICE. JULY 4, 1978.
4,104, 515.—CONSUMABLE CREDIT CARD. AUG. 1, 1978.
4,118,112.—METHOD FOR REDUCING POWER DISSIPATION IN TAPERED RESISTOR DEVICES. OCT. 3, 1978.
4,121,153.—TAPERED RESISTOR METER. OCT. 17, 1978.
4,126,824.—PROGRESSIVELY SHORTED TAPERED RESISTANCE DEVICE. NOV. 21, 1978.

Class 25A

3,692,404.—STRIPPABLE LAYER RELIEF PRINTING. SEPT. 19, 1972.
3,900,817.—SPHERICAL POTENTIOMETER WITH BALL CONTACT MEANS. AUG. 19, 1975.
3,990,072.—ACOUSTIC RESIDUE ALGEBRA DECORDER. NOV. 2, 1976.

Class 25A 1

3,061,911.—METHOD OF MAKING PRINTED CIRCUITS. NOV. 6, 1962.
3,075,866.—METHOD OF MAKING PRINTED CIRCUITS. JAN. 29, 1963.
3,207,127.—APPARATUS FOR FORMING COATINGS ON PRINTED CIRCUIT BOARDS. SEPT. 21, 1965. CAN. 0733463, FRA. 1374360, GER. 1490985, GRB. 1053284, ITL. 0696974.
3,217,209.—PRINTED CIRCUITS WITH RESISTIVE AND CAPACITIVE ELEMENTS. NOV. 9, 1965. CAN. 0782178, FRA. 1300771, GER. 1202853, GRB. 0978571, ITL. 0647493, JAP. 0430795.
3,219,509.—AN APPARATUS FOR AUTOMATIC FABRICATION OF MICROCIRCUITRY. NOV. 23, 1965. CAN. 0785448, GRB. 1031288, JAP. 0477810.
3,288,639.—METHOD FOR MAKING A PLURAL LAYERED PRINTED CIRCUIT BOARD. NOV. 29, 1966.
3,485,934.—CIRCUIT BOARD. DEC. 23, 1969.
3,893,409.—APPARATUS FOR SOLDER COATING PRINTED CIRCUIT. JULY 8, 1975.
3,990,024.—MICROSTRIP STRIPLINE IMPEDANCE TRANSFORMER. NOV. 2, 1976.

4,018,414.—HOLDING FIXTURES. APR. 19, 1977.
4,024,631.—PRINTED CIRCUIT BOARD PLATING PROCESS. MAY 24, 1977.
4,029,373.—MEANS FOR WIRING INTO A SEALED ENCLOSURE. JUNE 14, 1977. CAN. 0995367, GRB. 1444032.
3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
4,046,105.—LAMINAR DEEP WAVE GENERATOR. SEPT. 6, 1977.
4,048,718.—PIN CRIMPING APPARATUS AND PRODUCT THEREFROM. SEPT. 20, 1977.
4,083,323.—PNEUMATIC SYSTEM FOR SOLDER LEVELING APPARATUS. APR. 11, 1978.
4,125,136.—CUT AND CLINCH MECHANISM. NOV. 14, 1978.

Class 25A 2

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
3,164,750.—ELECTRONIC PACKAGING APPARATUS. JAN. 5, 1965.
3,445,926.—PRODUCTION OF SEMICONDUCTOR DEVICES BY USE OF ION BEAM IMPLANTATION. MAY 27, 1969.
3,906,537.—SOLID STE ELMNT CMPRSNG SMI-CNDCTVE GLS CMPSTN EXHBING NGTVE INCRMNTL RSISTNCE AND TRSHLD SWTCHNG. SEPT. 16, 1975. BEL. 0820772, CAN. 1005929.
3,956,042.—SELECTIVE ETCHANTS FOR THIN FILM DEVICES. MAY 11, 1976.

Class 25A 3

3,244,556.—ABRASION FOR THIN FILM RESISTANCE CONTROL. APR. 5, 1966. CAN. 0788954, FRA. 1385420, GER. 1490986, GRB. 1054076, ITL. 0705899, JAP. 0453904.
3,274,372.—SOLID VAPORIZATION. SEPT. 20, 1966.
3,287,161.—METHOD FOR FORMING A THIN FILM RESISTOR. NOV. 22, 1966. CAN. 0819895, ITL. 0705900, JAP. 0499787.
3,352,731.—THIN FILM PRINTED CIRCUIT. NOV. 14, 1967. AUS. 0296168, CAN. 0790796, FRA. 1419084, GER. 1490987, GRB. 1077686, ITL. 0739442, JAP. 0537661.
3,413,716.—THIN FILM INDUCTOR ELEMENTS. DEC. 3, 1968. CAN. 0841245, FRA. 1476476, GRB. 1149759.
3,832,766.—APPARATUS FOR ASSEMBLING A PLATED WIRE MEMORY PLANE. SEPT. 3, 1974. CAN. 0942420, GRB. 1376654.

Class 25A 4

3,317,656.—ELECTRICAL CONNECTION FOR SHEATHED CONDUCTORS. MAY 2, 1967.
3,603,357.—BACKWIRING. SEPT. 7, 1971.
3,644,659.—CABLE CONSTRUCTION. FEB. 22, 1972.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,847,479.—COVER FOR WIRE WRAPPED CARD CHASSIS. NOV. 12, 1974.
3,861,775.—MULTIPLE CIRCUIT BOARD CONNECTOR. JAN. 21, 1975. GRB. 1419580.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,937.—BACK WIRING. SEPT. 9, 1975.
4,045,750.—ELECTRICAL CABLE AND COUPLING ARRANGEMENT. AUG. 30, 1977. FRA. 7631197.

Class 25B

3,688,127.—DIGITAL CIRCUIT LOGIC. AUG. 29, 1972.
3,937,986.—LINEAR WAVEFORM GENERATOR. FEB. 10, 1976.
3,975,755.—STABLE NON-CRYSTALLINE MATERIAL FOR SWITCHING DEVICES. AUG. 17, 1976.
4,095,020.—PROCESS FOR CONTROLLED PHASE TRANSFORMATION OF ALPHA PHASE OF POLY (VINYLIDENE FLUORIDE) TO. JUNE 13, 1978.

Class 25B 1

3,384,792.—STACKED ELECTRODE FIELD EFFECT TRIODE. MAY 21, 1968.
3,584,268.—INVERTED SPACE CHARGE LIMITED TRIODE. JUNE 8, 1971.
3,599,321.—INVERTED SPACE CHARGE LIMITED TRIODE. AUG. 17, 1971.

Class 25B 2

3,510,735.—HIGH SPEED SEMICONDUCTOR. MAY 5, 1970.
3,673,572.—ELECTROLUMINESCENT DEVICE. JUNE 27, 1972. CAN. 0919286.
3,697,163.—PLUG-IN VACUUM AND CIRCUIT SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. OCT. 10, 1972. CAN. 0941883.

Class 25B 3

3,551,727.—THERMIONIC CONVERTER HAVING A LOW FUNCTION COLLECTOR ELECTRODE. DEC. 29, 1970.
3,928,812.—PROGRAMMABLE BIT CLOCK OSCILLATOR FOR CONTROLLING THE PROCESSING OF BINARY DIGITS. DEC. 23, 1975. CAN. 0997434.

Class 25B 4

3,579,031.—ZERO ARC DROP THYRATRON. MAY 18, 1971.

Class 25C

3,911,420.—DISPLAY SYSTEM INCLUDING A HIGH-RESOLUTION CHARACTER GENERATOR. OCT. 7, 1975.
3,937,937.—PRIMARY POWER FAULT DETECTOR. FEB. 10, 1976. CAN. 1011818.
4,045,750.—ELECTRICAL CABLE AND COUPLING ARRANGEMENT. AUG. 30, 1977. FRA. 7631197.
4,136,277.—EXPOSURE CONTROL SYSTEM FOR A DOCUMENT COPYING MACHINE. JAN. 23, 1979. GRB. 1529220.

Class 25C 1

3,296,483.—WIDEBND AMPLER UTLZNG COMN ELCTRN BEAM FR INTRACTN W/HIFRQCY TRVLGWAVE LINE AND W/LOWFRQCY ELCTRN M. JAN. 3, 1967.
3,299,367.—FEEDBACK AMPLIFIER. JAN. 17, 1967.
3,404,341.—ELECTROMETER UTILIZING A DUAL PURPOSE FIELD-EFFECT TRANSISTOR. OCT. 1, 1968.
3,457,520.—FIELD EFFECT TRANSISTOR BUFFER AMPLIFIER. JULY 22, 1969. CAN. 0830628, FRA. 1541017, GER. 1562109, GRB. 1189515, ITL. 0806188, JAP. 0573712.
3,525,948.—SEISMIC AMPLIFIERS. AUG. 25, 1970.
3,594,654.—DIRECT COUPLED DIFFERENTIAL AMPLIFIER. JULY 20, 1971.
3,790,288.—PHOTOMETER INCLUDING VARIABLE AMPLIFICATION AND DARK CURRENT COMPENSATION. FEB. 5, 1974.

Class 25C 2

3,316,495.—LOW LEVEL COMMUTATOR. APR. 25, 1967.
3,426,259.—ELECTRIC CONTROL CIRCUITS FOR SEQUENTIAL OPERATION OF MOTIVE MEANS. FEB. 4, 1969.
3,454,884.—DUTY CYCLE CONTROL CIRCUIT. JULY 8, 1969. CAN. 0859886, GRB. 1195983, JAP. 0576017.
3,612,907.—SELF-CHECKING FLIP-FLOP. OCT. 12, 1971.
3,668,414.—TRANSITION INTEGRATION SWITCHING AMPLIFIER. JUNE 6, 1972. ARG. 0183473, AUS. 0460647, BEL. 0765005, CAN. 0930432, FRA. 7111626, GRB. 1334407, ITL. 0921529, MEX. 0119755, USR. 0420197, VZL. 0027511.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,806,242.—APPARATUS FOR REGULATING OPERATION OF DEV IN ACCORDANCE W SUPPLY OF MATERIAL UPON WHICH DEV OPER. APR. 23, 1974. CAN. 1004288, GRB. 1387190.
3,828,222.—FLASH LAMP CIRCUIT. AUG. 6, 1974.
3,856,997.—INDICATING AND SWITCHING APPARATUS. DEC. 24, 1974. BEL. 0809124, CAN. 1004261, ITL. 1002375, MEX. 0135820, SPN. 0421710.
3,866,051.—DIGITAL INTERFACE MODULE. FEB. 11, 1975. BEL. 0810490, GBR. 1455213.
3,932,770.—CONTROL CIRCUIT FOR SWITCHING TRIACS. JAN. 13, 1976.
4,119,840.—FAST-ACTING GAIN PHOTOCURRENT DEVICE. OCT. 10, 1978.

Class 25C 3

3,311,810.—STATIC FREQUENCY MULTIPLIER UTILIZING A PLURALITY OF SATURABLE MAGNETIC CORES. MAR. 28, 1967.
3,340,416.—RADIATION GENERATOR HVNG A CONDCTV COATNG ON A PIEZO-ELCTRC DIFFRCTN GRATING FOR VARYNG OTPT FR. SEPT. 5, 1967.

3,373,377.—SELF-ADJUSTING VARIABLE FREQUENCY SAWTOOTH GENERATOR. MAR. 12, 1968.
3,543,080.—CRT PINCUSHION DISTORTION CORRECTION APPARATUS. NOV. 24, 1970.
3,659,207.—MULTI-WAVE FORM GENERATION FROM A SINGLE TAPPED DELAY LINE. APR. 25, 1972.
4,048,571.—FREQUENCY DOUBLER. SEPT. 13, 1977.

Class 25C 4

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3416,861-D1593. AUG. 7, 1973.
3,280,309.—LOGARITHMIC PULSE COUNTER. OCT. 18, 1966.
3,416,861.—SIGNAL STORAGE DEVICE—REISSUED D72104-27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,422,287.—PULSE STRETCHING CIRCUIT FOR GENERATING PULSES OF MINIMUM WIDTH. JAN. 14, 1969. AUS. 0408950, CAN. 0814593, GRB. 1087749, ITL. 0773401, SWD. 0337041.
3,593,043.—PULSE SHAPING CIRCUIT. JULY 13, 1971.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,757,032.—METHOD AND APPARATUS FOR SELECTIVELY ENABLING A REMOTE RECEIVER. SEPT. 4, 1973.
3,781,548.—CONTROL SYSTEM. DEC. 25, 1973.
3,816,727.—ECHO CHECK CIRCUIT. JUNE 11, 1974. CAN. 0999463, FRA. 7341866, GRB. 1422835.
3,839,665.—APP MEASRNG RELTV VELCTY MOVBL MEMBR INCLDNG MEANS TO DETECT VELCTY FROM POSITION ENCODER. OCT. 1, 1974. CAN. 0980409, GRB. 1290090, JAP. 0832378.
3,863,143.—APP FOR RECORDING THE OCCURRENCE OF A PREDETERMINED OPERATION BY SENSING MAGNETIC FIELD OPERATION. JAN. 28, 1975.
3,875,387.—MAGNETIC OPERATIONS MONITOR. APR. 1, 1975.
3,931,580.—DIGITAL LINE RECEIVER CIRCUIT. JAN. 6, 1976.
3,953,708.—THERMAL PRINTER USING AMORPHOUS SEMICONDUCTOR DEVICES. APR. 27, 1976.
3,971,919.—PROGRAMMABLE BILLING SYSTEM. JULY 27, 1976. BEL. 0812673, FRA. 7409746, GRB. 1451993, ITL. 1007663, SPN. 0424543.
3,983,315.—ELECTROMAGENTIC COUNTER CIRCUIT. SEPT. 28, 1976.
3,987,311.—SHIFT REGISTER UTILIZING AMORPHOUS SEMICONDUCTOR THRESHOLD SWITCHE. OCT. 19, 1976.
3,989,930.—MULTI-MODE BILLING SYSTEM CONTROLLED BY COPY SIZE AND DOCUMENT ORIGINAL SIZE. NOV. 2, 1976.
4,119,907.—POWER FACTOR CORRECTOR FOR A RESISTIVE LOAD. OCT. 10, 1978.
4,140,962.—HIGH VOLTAGE REGULATOR USING LIGHT DEPENDENT RESISTOR. FEB. 20, 1979. BEL. 867865.

Class 25C 5

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,496,385.—HIGH VOLTAGE COMPENSATED TRANSISTORIZED SWITCHING APPARATUS. FEB. 17, 1970. CAN. 0853862, FRA. 1521443, GRB. 1181718, ITL. 0793728, JAP. 0592682.
3,522,509.—FLOATING POWER SUPPLY. AUG. 4, 1970.
3,809,916.—DUAL CORD INTERLOCK. MAY 7, 1974. CAN. 1004283, GRB. 1423758.
3,870,903.—PHASE CONTROLLED POWER SUPPLY. MAR. 11, 1975.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,004,209.—WIDE RANGE POWER CONVERSION SYSTEM. JAN. 18, 1977.

Class 25C 6

3,192,519.—DIGITAL TRANSIENT ANALYZER. JUNE 29, 1965.
3,376,490.—SYNTHESIZED WAVE STATIC INVERTERS. APR. 2, 1968.
3,508,080.—BRIDGE GATING NETWORK HAVING POWER GAIN. APR. 21, 1970.
3,555,540.—DIGITAL TO ANALOG CONVERTER WITH SMOOTHED RECOVERY. JAN. 12, 1971.
3,599,037.—GAS LAMP LEAD BALLAST CIRCUIT HAVING FEED CONTROL. AUG. 10, 1971. ARG. 0182960, BEL. 0749784, CAN. 0907126, FRA. 7015813, GRB. 1308525, ITL. 0900023, MEX. 0116550.
3,638,089.—SPEED CONTROL SYSTEM HAVING HIGH AND LOW LEVEL SPEED MEANS. JAN. 25, 1972. GRB. 1322611.
3,670,269.—AUTOMATIC TRANSVERSAL EQUALIZER. JUNE 13, 1972. CAN. 0932412, GRB. 1353018.
3,689,915.—ENCODING SYSTEM. SEPT. 5, 1972. CAN. 0870252, GER. 1562051, GRB. 1207701, JAP. 0675600.
3,691,542.—MAGNETIC MEMORY DISK DRIVE APPARATUS WITH REDUCED R.F. NOISE. SEPT. 12, 1972. GRB. 1328717, JAP. 0840914.
3,699,555.—APPARATUS FOR RAPID ACTION DISPLACEMENT CONTROL. OCT. 17, 1972. CAN. 985413, GRB. 1366124.
3,737,569.—TRANSMISSION DEVICE. JUNE 5, 1973.
3,742,374.—TRANSDUCER DEVICE. JUNE 26, 1973.
3,761,799.—CURRENT STABILIZING CIRCUIT HAVING MINIMAL LEAKAGE CURRENT EFFECTS. SEPT. 25, 1973. BEL. 0792285. FRA. 7243406, GRB. 1395600, ITL. 0971515, MEX. 131737.
3,778,817.—OUTPUT KEYBOARD APPARATUS AND SIGNAL TRANSLATING METHODS THEREFOR. DEC. 11, 1973.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,818,297.—MOTOR CONTROL APPARATUS. JUNE 18, 1974. CAN 1004296, GRB. 1454269.
3,832,065.—DRUM TRACK DETECTOR. AUG. 27, 1974. GRB. 1458283.
3,880,516.—DIAGNOSTIC CIRCUIT BOARD. APR. 29, 1975. BEL. 0808231, FRA. 7342590, GRB. 1447394, ITL. 1002163, SPN. 421149.
3,904,922.—LAMP CONTROL AND LAMP SWITCH CIRCUIT. SEPT. 9, 1975.
3,906,194.—SIGNAL PROCESSOR. SEPT. 16, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,918,046.—DIGITAL TO ANALOG CONVERTER. NOV. 4, 1975. ARG. 0197211, BEL. 0795801, FRA. 7305890, GRB. 1417772, ITL. 0979289, MEX. 131264, SPN. 0411883, STZ. 0564887.
3,922,595.—HIGH POWER REGULATED D C SUPPLY NOV. 25, 1975.
3,928,772.—TIME DEPENDENT FAULT DETECTOR. DEC. 23, 1975. BEL. 0826690.
3,989,371.—CYCLE-OUT LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 2, 1976.
3,991,355.—STEPPER MOTOR CONTROL. NOV. 9, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,074,147.—SWITCHING AMPLIFIERS. FEB. 14, 1978.
4,101,788.—MOS BUFFER CIRCUIT. JULY 18, 1978.
4,103,252.—CAPACITIVE TOUCH-ACTIVATED TRANSDUCER SYSTEM INCLUDING A PLURALITY OF OSCILLATORS. JULY 25, 1978.
4,129,807.—CURRENT REGULATING CIRCUIT FOR MAGNETIC DEFLECTION SYSTEMS. DEC. 12, 1978.

Class 26

D.225,572.—BOOK STACKING UNIT FOR XEROGRAPHIC REPRODUCTION MACHINE. DEC. 19, 1972.
D.231,127.—COPYING MACHINE-LARGE DOCUMENT COPYING FRAME-DECOY. APR. 2, 1974.
D.231,128.—COPYING MACHINE. APR. 2, 1974.
D.231,129.—COPYING MACHINE. APR. 2, 1974.
D.231,564.—COPYING MACHINE. APR. 30, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
D.236,446.—CART. AUG. 26, 1975.
D.236,491.—COMPUTER CABINET. AUG. 26, 1975.
D.236,897.—COMPUTER CABINET. SEPT. 23, 1975.
D.236,961.—BALANCE SCALE. SEPT. 30, 1975.
D.238,450.—PAPER CASSETTE. JAN. 13, 1976.
D.238,966.—COPIER EVENT RECORDER. FEB. 24, 1976.
D.239,063.—STORAGE UNIT. MAR. 9, 1976.
D.239,064.—STORAGE UNIT. MAR. 9, 1976.
D.239,065.—STORAGE UNIT. MAR. 9, 1976.
D.239,066.—STORAGE UNIT. MAR. 9, 1976.
D.239,067.—STORAGE AND DISPLAY UNIT. MAR. 9, 1976.
D.239,106.—SEMICONDUCTOR EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,107.—PARALLEL RL/RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,108.—RLC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,109.—SERIES RL AND RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.

D.239,110.—EDUCATIONAL DEVICE FOR LEARNING ABOUT RECTIFIERS AND FILTERS. MAR. 9, 1976.
D.239,351.—STORAGE AND DISPLAY UNIT. MAR. 30, 1976.
D.239,392.—COMPUTER CABINET. MAR. 30, 1976.
D.239,750.—STORAGE UNIT. MAY 4, 1976.
D.239,995.—STORAGE UNIT. MAY 25, 1976.
D.240,192.—DESIGN FOR MICROFILM REEL. JUNE 8, 1976.
D.240,540.—COMPUTER TERMINAL. JULY 13, 1976.
D.240,554.—DUPLICATING MACHINE WITH SORTER. JULY 13, 1976.
D.240,555.—SORTER. JULY 13, 1976.
D.240,557.—TRAY RACK. JULY 13, 1976.
D.240,965.—COIN OPERATED REPRODUCTION MACHINE. AUG. 10, 1976.
D.241,982.—ADAPTER FOR COMPRESSING HUMAN BODY ORGANS FOR X-RAY TREATMENT OR THE LIKE. OCT. 19, 1976.
D.246,226.—TONER CONTAINER OR THE LIKE. NOV. 1, 1977.
D.247,673.—STRIPPER PAD. APR. 4, 1978.
D.247,674.—STRIPPER PAD. APR. 4, 1978.
D.247,675.—STRIPPER PAD. APR. 4, 1978.
D.248,765.—MICROFICHE COPIER. AUG. 1, 1978.
D.250,765.—FANFOLD SHEET STACKING TRAY. JAN. 9, 1979.

Class 26A

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.227,933.—SORTER. JULY 24, 1973.
D.236,850.—CONTROL PANEL FOR A COPIER. SEPT. 16, 1975.
D.237,905.—CONTROL PANEL OF A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.
D.238,818.—PLATEN COVER FOR COPIER. FEB. 10, 1976.
D.239,138.—XEROGRAPHIC COPIER. MAR. 9, 1976.

Class 26A 1

D.163,640.—XEROGRAPHIC COPYING DEVICE. JUNE 12, 1951.
D.165,993.—PAPER REGISTRATION GUIDE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 19, 1952.
D.172,906.—A XEROGRAPHIC PROCESSOR. AUG. 24, 1954.
D.186,832.—DOCUMENT REPRODUCING APPARATUS. DEC. 8, 1959.
D.188,633.—DOCUMENT REPRODUCING APPARATUS. AUG. 16, 1960.
D.193,450.—DOCUMENT REPRODUCING APPARATUS. AUG. 21, 1962.
D.194,815.—DOCUMENT REPRODUCING APPARATUS. MAR. 12, 1963.
D.200,272.—DOCUMENT REPRODUCING APPARATUS. FEB. 9, 1965. CAN. 2092730.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,558.—REPRODUCTION MACHINE. AUG. 16, 1966.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.208,337.—XEROGRAPHIC DOCUMENT REPRODUCING APPARATUS OR SIMILAR ARTICLE. AUG. 15, 1967.
D.210,558.—DOCUMENT REPRODUCING MACHINE. MAR. 19, 1968.
D.210,630.—DOCUMENT REPRODUCING APPARATUS. MAR. 26, 1968.
D.210,856.—DOCUMENT REPRODUCING APPARATUS. APR. 23, 1968.
D.214,699.—DOCUMENT REPRODUCING MACHINE. JULY 15, 1969. ARG. 0011028, CAN. 2543184, MEX. 0011135.
D.218,199.—DOCUMENT REPRODUCING MACHINE. JULY 28, 1970. CAN. 0033011, GRB. 0946459.
D.218,201.—REPRODUCTION MACHINE. JULY 28, 1970. ARG. 0014313, BEL. 0017005, CAN. 0033518, CHL. 0000996, GRB. 0946818, JAP. 0363075, MEX. 0011194, PNM. 0002073, VZL. 0000744.
D.219,889.—XEROGRAPHIC PROCESSOR HOUSING. FEB. 9, 1971.
D.221,694.—XEROGRAPHIC PROCESS HOUSING. AUG. 31, 1971.
D.227,931.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JULY 24, 1973.
D.230,513.—REPRODUCTION MACHINE. FEB. 26, 1974.
D.238,737.—COPYING MACHINE STAND. FEB. 10, 1976.
D.243,008.—COIN OPERATED REPRODUCTION MACHINE. JAN. 11, 1977.

Class 26A 2

D.214,959.—AUTOMATIC DOCUMENT FEEDING APPARATUS FOR XEROGRAPHIC REPRODUCING MACHINES OR THE LIKE. AUG. 12, 1969. CAN. 0032540, GER. DES5715, GRB. 0942720.
D.227,034.—DOCUMENT FEEDER FOR A XEROGRAPHIC REPRODUCTION. MAY 29, 1973.
D246,373.—PAPER OVERFEED TRAY. NOV. 15, 1977.

Class 26A 3

D.200,129.—XEROGRAPHIC TRANSFER AND FUSING APPARATUS. JAN. 19, 1965.
D.233,481.—XEROGRAPHIC VAPOR FUSING APPARATUS. OCT. 29, 1974.

Class 26A 4

D.201,405.—XEROGRAPHIC PRINTER. JUNE 15, 1965.
D.220,188.—MOBILE PRINTER. MAR. 16, 1971. CAN. 0033207, GER. 0MR6294, GRB. 0946460, JAP. 0443861.
D.230,517.—COMPUTER OUTPUT PRINTER. FEB. 26, 1974.
D.232,125.—CHARACTER PRINT MEMBER. JULY 16, 1974.
D.237,010.—COMBINED RIBBON AND CARTRIDGE THEREFOR. SEPT. 30, 1975. FRA. 0073134, GRB. 0967791, ITL. 0010845.
D.238,904.—CHARACTER PRINT MEMBER. FEB. 17, 1976.
D.238,968.—CHARACTER PRINT MEMBER. FEB. 24, 1976. FRA. 0073135, GER. 0009989, GRB. 0967792, ITL. 0010846.
D.250,950.—CONTROL CONSOLE MODULE FOR A COMPUTER PRINTER. JAN. 30, 1979.
D.250,952.—MODULAR COMPUTER PRINTER. JAN. 30, 1979.
D.250,953.—MODULAR COMPUTER PRINTER. JAN. 30, 1979.
D.250,954.—MODULAR COMPUTER PRINTER. JAN. 30, 1979.

Class 26A 5

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.

Class 26B

D.209,408.—CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,409.—MODULAR CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,872.—DOCUMENT REPRODUCING AND SORTING MACHINE. JAN. 9, 1968.
D.212,227.—A TAPE CONTRL UNIT FOR AN AUTOMATIC SORTER OR THE LIKE. SEPT. 17, 1968.
D.224,054.—XEROGRAPHIC REPRODUCTION MACHINE OR THE LIKE. JUNE 27, 1972.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.236,330.—REPRODUCTION MACHINE STACKING CART. AUG. 19, 1975.
D.236,924.—PAPER HANDLING STAND. SEPT. 30, 1975.
D.237,871.—REPRODUCTION MACHINE STACKING CART. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

Class 26C

D.205,910.—A CAN. OCT. 4, 1966.
D.208,377.—CONTAINER FOR XEROGRAPHIC TONER POWDER. AUG. 22, 1967.
D.211,928.—BOTTLE. AUG. 13, 1968.
D.218,152.—CONTAINER FOR XEROGRAPHIC POWDER. JULY 28, 1970. CAN. 0032629, GRB. 0944047.
D.236,694.—DEVELOPER MIX STORAGE CONTAINER. SEPT. 9, 1975.
D.240,201.—TONER PARTICLE STORAGE CONTAINER-DESIGN FOR TONER CARTRIDGE. JUNE 8, 1976.
D.244,007.—TONER BOTTLES. APR. 12, 1977.

Class 26D

D.216,647.—SPRING SCALE. FEB. 24, 1970. CAN. 0032577, GRB. 0943939.
D.220,011.—ARTICLE ADDRESSING MACHINE. FEB. 23, 1971.

3,666,948.—LIQUID CRYSTAL INFRARED IMAGING SYSTEM HAVING AN UNDISTURBED IMAGE ON A DISTURBED BACKGROUND. MAY 30, 1972. CAN. 0964455, GRB. 1387276.
3,737,896.—APPARATUS FOR RECOVERY OF RECORDED BIT INFORMATION IN A MAGNETIC RECORDING MEDIUM. JUNE 5, 1973. AUS. 0471989, BEL. 0790688, CAN. 1008967, STZ. 0563642.
D.246,102.—FILM REEL (DESIGN). OCT. 18, 1977.

Class 26E

D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

Class 26E 1

D.200,127.—FACSIMILE TRANSMITTER. JAN. 19, 1965.
D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.
D.215,218.—FACSIMILE TRANSCEIVER. SEPT. 16, 1969. ARG. 0010244, BEL. 0016600, CAN. 2493134, FRA. 0096592, GER. 0005411, GRB. 0939330, ITL. 0134198. MEX. 0010900.
D.218,170.—FACSIMILE TRANSCEIVER. JULY 28, 1970. GRB. 0944047.
D.225,860.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,861.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,867.—UNATTENDED TELEPHONE ANSWERING APPARATUS OR SIMILAR ARTICLE. JAN. 9, 1973.
D.227,121.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.
D.227,122.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.

Class 26E 2

D.215,849.—A ROLL-FEED APPARATUS FOR A FACSIMILE TRANSCEIVER. NOV. 4, 1969. ARG. 0011067, BEL. 0016764, CAN. 0032344, GER. DES5719, GRB. 0942723, ITL. 0138774, MEX. 0010975, PNM. 0001983, VZL. 0000663.
D.216,123.—FLEXIBLE SHEET MATERIAL GUIDE FOR A FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. NOV. 25, 1969. GRB. 0942748.
D.216,564.—GUIDE FOR FLEXIBLE SHEET MATERIAL FOR FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. FEB. 10, 1970. ARG. 0011068, BEL. 0016763, GER. DES5716, GRB. 0942723, ITL. 0138775, MEX. 0011018, PNM. 0001401, VZL. 0000662.
D.249,688.—PAPER TAKE UP REEL OR SIMILAR ARTICLE FOR A WEB FED FACSIMILE TRANSCEIVER OF THE LIKE. SEPT. 26, 1978.

Class 26E 3

D.210,589.—ELECTRONIC ADAPTER FOR FACSIMILE COMPUTER SYSTEM. MAR. 26, 1968.

Class 26F

D.203,012.—DESIGN FOR A MACHINE FOR APPLYING INTELLIGENCE TO A MOVING ARTICLE. NOV. 23, 1965.
D.244,943.—FILM REEL (DESIGN). JULY 5, 1977.
D.246,102.—FILM REEL (DESIGN). OCT. 18, 1977.
D.247,667.—FILM REEL (DESIGN). APR. 4, 1978.

Class 26F 1

D.202,746.—MICROFICHE PRINTER. NOV. 2, 1965.
D.217,739.—COMBINED MICROFILM VIEWER AND REPRODUCING MACHINE ACCESSORY. JUNE 2, 1970. CAN. 0032698.
D.218,782.—PROJECTION VIEWER. SEPT. 22, 1970. CAN. 0033031, GER. OMR6147, GRB. 0945494, JAP. 413894.
D.218,783.—COMBINATION FILM VIEWING AND REPRODUCING MACHINE. SEPT. 22, 1970. CAN. 0033032, GER. OMR6146, GRB. 0945495, JAP. 0377263.
D.233,369.—MICROFILM XEROGRAPHIC MACHINE. OCT. 22, 1974.
D.236,544.—MICROFORM VIEWER. AUG. 26, 1975.
D.239,055.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.239,056.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.247,295.—MULTICOLOR TRANSPARENCY REPRODUCTION MACHINE. FEB. 21, 1978.

Class 26G

D.225,643.—REACTION TESTING DEVICE. DEC. 26, 1972.
D.225,681.—SUCTION MOUNTING DEVICE. DEC. 26, 1972.
D.226,662.—EDUCATIONAL DEVICE FOR DEMONSTRATING MOMENTUM. APR. 10, 1973.
D.232,030.—EDUCATIONAL AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 9, 1974.
D.232,031.—COLLISION DEMONSTRATION TEACHING AID. JULY 9, 1974.
D.232,098.—TEACHING AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 16, 1974.
D.232,698.—CLAMP. SEPT. 10, 1974.
D.233,432.—TEACHING AID FOR DEMONSTRATING PRINCIPLES OF PHYSICS. OCT. 29, 1974.
D.233,654.—CONTAINER FOR BOOKLETS OR THE LIKE. NOV. 19, 1974.
D.233,658.—BALANCE SCALE. NOV. 19, 1974.
D.233,935.—EDUCATIONAL DEVICE FOR TEACHING ARITHMETIC. DEC. 17, 1974.
D.234,546.—CARRYING CASE. MAR. 18, 1975.
D.235,440.—EDUCATIONAL PLUG-IN BOARD. JUNE 17, 1975.
D.235,441.—BASIC MEASUREMENT EDUCATIONAL BOARD. JUNE 17, 1975.
D.236,028.—MAGNIFIER. JULY 22, 1975.
D.236,729.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,730.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,978.—SWITCHING EDUCATIONAL BOARD. SEPT. 30, 1975.
D.236,979.—EDUCATIONAL MEASURING DEVICE BOARD. SEPT. 30, 1975.
D.237,020.—COMBINED SUPPORT AND STORAGE TRAY FOR AN EDUCATIONAL KIT OR SIMILAR ARTICLE. SEPT. 30, 1975.
D.237,877.—MOTOR AND GENERATOR EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,878.—MULTI-METER EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,879.—EDUCATIONAL DEVICE FOR LEARNING MAGNETISM & INDUCTION. DEC. 2, 1975.
D.237,880.—EDUCATIONAL DEVICE FOR LEARNING BASIC HAND TOOLS. DEC. 2, 1975.
D.242,787.—AN EDUCATIONAL AIDE FOR MEASURING MASS. DEC. 21, 1976.
D.242,793.—EDUCATIONAL AIDE FOR TEACHING PHYSICAL PROPERTIES OF LIGHT. DEC. 21, 1976.

Class 26G 1

D.216,157.—BALANCE SCALE. NOV. 25, 1969. BEL. 0016761, CAN. 0032611, GER. DES5718, GRB. 0942720, ITL. 0138772, JAP. 0337548.
D.236,731.—CURCUIT TESTING EDUCATIONAL BOARD. SEPT. 9, 1975.

Class 26H

D.236,556.—CARRYING CASE FOR COLORISTS MATERIALS OR THE LIKE. AUG. 26, 1975.

Class 26H 1

D.215,294.—HOUSING FOR ELECTRONIC APPARATUS. SEPT. 23, 1969. ARG. 0011066, BEL. 0016760, GER. 0005765, GRB. 0942725, ITL. 0138776, MEX. 0010934, PNM. 0001839, VZL. 0000664.
D.215,660.—HOUSING FOR ELECTRONIC APPARATUS. OCT. 21, 1969.
D.234,700.—DISC DRIVE CABINET. APR. 1, 1975.
D.238,494.—CONTROL PANEL FOR DISK FILE. JAN. 20, 1976.
D.238,495.—DISK MEMORY MODULE FRONT PANEL. JAN. 20, 1976.
D.240,632.—CABINET FOR ELECTRONIC EQUIPMENT. JULY 20, 1976.
D.241,446.—SINGLE MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,447.—SINGLE MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,448.—DUAL MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,449.—DUAL MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.

Class 26H 2

D.221,228.—KEYBOARD FOR A COMPUTER OR THE LIKE. JULY 20, 1971.

Class 26H 3

D.221,229.—SEND/RECEIVE DATA PRINTER TERMINAL. JULY 20, 1971.
D.224,019.—XEND/RECEIVE DATA PRINTER TERMINAL. JUNE 27, 1972.
D.236,129.—INPUT/OUTPUT TERMINAL. JULY 29, 1975.

Class 26H 4

D.212,692.—TELEPHONE ACOUSTIC COUPLER. NOV. 12, 1968. ARG. 0010245, BEL. 0016601, CAN. 2503147, FRA. 0096593. GER. 0005410, GRB. 0939331, ITL. 1341991, MEX. 0010845.
D.224,025.—ACOUSTIC COUPLER. JUNE 27, 1972.

Class 26H 5

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.206,956.—HOLLOW CORNER PRISM. FEB. 14, 1967.
D.237,849.—COOLING RACK. DEC. 2, 1975.

Class 26H 6

D.221,108 .—PAPER SHREDDER. JULY 6, 1971. CAN. 0033939.

Class 26H 7

D.221,901.—OVERHEAD PROJECTOR. SEPT. 14, 1971. CAN. 0033920.
D.231,800.—RIBBON CARTRIDGE. JUNE 11, 1974.
D.236,787.—BOOKCASE OR SIMILAR ARTICLE. SEPT. 16, 1975.
D.239,419.—TAPE CASSETTE STORAGE UNIT. MAR. 30, 1976.
D.239,472.—MAGNETIC CARD STORAGE TRAY. APR. 6, 1976.
D.239,531.—COPY HOLDER. APR. 13, 1976.
D.239,872.—CAMERA/PROJECTOR. MAY 11, 1976.
D.241,774.—PRINTER/KEYBOARD APPARATUS FOR ELECTRONIC TYPING SYSTEM OR SIMILAR ARTICLE. OCT. 5, 1976.
D.242,101.—FILE UNIT OR SIMILAR ARTICLE. NOV. 2, 1976.
D.242,102.—TABLE OR SIMILAR ARTICLE. NOV. 2, 1976.

Class 27A

3,615,614.—LIGHT DEV DIRCT PRINT SILVER HALIDE EMULSION SENSITIZD W/ COMBINTN OF COPPER, LEAD, BROMIDE AND THIOU. OCT. 26, 1971.
3,660,100.—DIRECT-PRINT LIGHT DEVELOPABLE EMULSION. MAY 2, 1972.
3,725,073.—LIGHT DEVELOPABLE DIRECT WRITING, SILVER HALIDE EMULSIONS CONTAINING GOLD, IODINE, LEAD AND COP. APR. 3, 1973. CAN. 0882613.
3,782,960.—DRCT-PRNT LIGHT-DVLPBL EMULSN CNTAING SILVER HALIDE GRAINS SNSTZD SENSTZD ON THE SURFACES W/SI. JAN. 1, 1974. BEL. 0780680, CAN. 0994590, GRB. 1384081, ITL. 0950280.
3,849,146.—DIRECT-PRINT LIGHT-DEVELOPBL SILVER HALIDE EMULSION CONTAINING CYCLIC DIOXIDE OR SELENONE AS SEN. NOV. 19, 1974.

Class 27B

3,631,232.—APPARATUS FOR SIMULATING THE ELECTRICAL CHARACTERISTICS OF A NETWORK. DEC. 28, 1971. CAN. 0951429, GRB. 1267785.
4,125,318.—TIR MODULATOR. NOV. 14, 1978.

Class 27C

3,736,133.—TRANSPARENT INK—ABSORBENT LACQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583, GRB. 1390137, MEX. 0127276, VZL. 0033577.
3,773,513.—DIMENSIONALLY STABLE PHOTOGRAPHIC PAPER CONTAINING GLASS FIBERS. NOV. 20, 1973.

Class 27D

RE.22,654.—PHOTOGRAPHIC DEVELOPING MACHINE—RE OF 2,347,189-D3946. JULY 3, 1945.
2,347,189.—PHOTOGRAPHIC DEVELOPING MACHINE—REISSUED D348-22,654. APR. 25, 1944.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METAL⊐IC SURFACE. JULY 16, 1968.

Class 27H 1

4,077,019.—TRANSVERSE MODE CONTROL IN DOUBLE-HETEROSTRUCTURE LASERS UTILIZING SUBSTRATE LOSS. FEB. 28, 1978.

Class 30

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 30A

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.
3,707,368.—MANIFOLD IMAGING PROCESS. DEC. 26, 1972.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

Class 30B

3,642,363.—MANIFOLD IMAGING SYSTEM. FEB. 15, 1972. CAN. 0960289, GRB. 1328405, JAP. 0770137.
3,661,454.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. MAY 9, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,741,641.—MANIFOLD IMAGING APPARATUS. JUNE 26, 1973.
3,748,034.—MANIFOLD IMAGING MACHINE. JULY 24, 1973. BEL. 0777713, CAN. 0948694, FRA. 7200999, GRB. 1376661, ITL. 0946353, SPN. 0398585, SWD. 7200573.
3,761,174.—MANIFOLD WEB HANDLING. SEPT. 25, 1973.
3,768,902.—MANIFOLD IMAGING. OCT. 30, 1973.
3,876,937.—LAYER TRANSFER IMAGING SYSTEM. APR. 8, 1975. CAN. 0933996, GRB. 1282725, JAP. 0726369.
3,963,340.—IMAGING APPARATUS. JUNE 15, 1976.
4,103,995.—IMAGING APPARATUS. AUG. 1, 1978.

Class 30C

3,615,393.—MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION. OCT. 26, 1971. BEL. 0746582, CAN. 0965829, FRA. 7007627, GRB. 1295533, ITL. 0886478, JAP. 0727962.
3,653,892.—MANIFOLD IMAGING PROCESS WHEREIN THE IMAGED ELEMENTS MAY BE RECOMBINED AND REUSED. APR. 4, 1972. CAN. 0916967, GRB. 1320407, JAP. 0731611.
3,676,116.—IMAGE REVERSAL IN MANIFOLD IMAGING USING ELECTRICALLY CONDUCTIVE RECEIVER SHEET. JULY 11, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378. GRB. 1340685, JAP. 0758465.
3,692,516.—MANIFOLD IMAGING METHOD - PHAROS MANIFOLD IMAGING REVERSAL. AUG. 19, 1972. CAN. 0929204, GRB. 1320012, JAP. 0759476.
3,692,518.—MANIFOLD IMAGING PROCESS. SEPT. 19, 1972. ARG. 0191965, BEL. 0749174, CAN. 0916496, FRA. 7013872, GRB. 1309649, ITL. 0899700, JAP. 0731228, MEX. 0116175.
3,718,462.—MANIFOLD ELECTRIFICATION PROCESS. FEB. 27, 1973. CAN. 0947366, GRB. 1313712, JAP. 0739530.
3,737,311.—ELECTROSTATIC PARTICLES TRANSFER IMAGING PROCESS. JUNE 5, 1973.
3,756,812.—MANIFOLD IMAGING PROCESS. SEPT. 4, 1973.
3,761,258.—IMAGING PROCESS EMPLOYING CHARGED DONOR AND RECEIVER SHEETS. SEPT. 25, 1973.
3,776,721.—MANIFOLD IMAGING. DEC. 4, 1973.
3,844,780.—IMAGING PROCESS. OCT. 29, 1974.
3,846,127.—IMAGING SYSTEM. NOV. 5, 1974.
3,850,626.—IMAGING MEMBER AND METHOD. NOV. 26, 1974. GRB. 1464653.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.
3,861,910.—MANIFOLD IMAGING PROCESS. JAN. 21, 1975. ARG. 0198477, BEL. 0744343, CAN. 0947363, FRA. 7001127, GRB. 1284521, ITL. 0885940, JAP. 0727960, MEX. 0111440.

3,909,257.—MANIFOLD IMAGING PROCESS WITH SPOOL ELECTRODE. SEPT. 30, 1975.

Class 30D

3,598,581.—MANIFOLD IMAGING METHOD. AUG. 10, 1971. ARG. 0198157, AUS. 0413154, BEL. 0713100, BRA. 6795099, CAN. 0889250, CHL. 0024249, CLB. 0017928, FRA. 1560020, GER. 1772114, GRB. 1200712, HOL. 0149611, ITL. 0829693, JAP. 0626106, LXB. 0055806, MEX. 0100797, NOR. 0128040, PRU. 0009737, SPN. 0352316, STZ. 0474097, SWD. 0340404, URG. 0009203, VZL. 0023690.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.

3,907,558.—MANIFOLD IMAGING UTILIZING SILICA GEL ACTIVATING LAYER. SEPT. 23, 1975.

3,912,504.—MANIFOLD IMAGING WITH THERMAL ACTIVATOR CONTAINED IN A SILICA GEL LAYER. OCT. 14, 1975.

3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

3,964,904.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER. JUNE 22, 1976. BEL. 0832405.

4,015,983.—A METHOD OF ERASING MANIFOLD IMAGES. APR. 5, 1977.

4,108,655.—METHOD OF MAKING A THERMO ACTIVE IMAGING MEMBER. AUG. 22, 1978.

Class 30E

3,653,889.—METHOD OF FIXING MANIFOLD IMAGES. APR. 4, 1972. BEL. 0754024, CAN. 0921745, FRA. 7028279, GRB. 1322772, ITL. 0900939, JAP. 0739529.

3,658,519.—IMAGE TRANSFER PROCESS FROM CONDUCTIVE SUBSTRATES. APR. 25, 1972. ARG. 0195536, AUS. 0456406, BEL. 0760747, BRA. 7022093, CAN. 0960290, FRA. 7047144, GRB. 1337590, ITL. 0913848, MEX. 0119590, SWD. 7017293.

3,706,553.—TRANSFER OF IMAGES TO A NON-CONDUCTIVE SUBSTRATE. DEC. 19, 1972. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,708,288.—IMAGE TRANSFER PROCESS. JAN. 2, 1973. CAN. 0882053, GRB. 1298922, JAP. 0757867.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,746,538.—IMAGE TRANSFER PROCESS. JULY 17, 1973. CAN. 0951781, GRB. 1374841.

3,793,017.—IMAGING FIXING METHOD. FEB. 19, 1974.

3,819,368.—MANIFOLD IMAGING MEMBER EMPLOYING A FIXATIVE LAYER. JUNE 25, 1974.

3,825,423.—IMAGE TRANSFER PROCESS. JULY 23, 1974.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

Class 30F

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.

3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.

3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.

Class 30G

3,655,372.—IMAGE REVERSAL IN MANIFOLD IMAGING. APR. 11, 1972.

3,901,697.—MANIFOLD IMAGING PROCESSUSING ELECTRONICS PHOTOSENSITIVE MATERIAL SUBJECT TO LIGHT FATIGUE. AUG. 26, 1975.

Class 30H

3,649,117.—IMAGING PROCESS. MAR. 14, 1972. BEL. 0761133, CAN. 0985732, FRA. 7047700, GRB. 1340679, ITL. 0914070, JAP. 0759480.

3,918,967.—CONTACT REFLEX MANIFOLD IMAGING PROCESS. NOV. 11, 1975. ARG. 0183676, BEL. 0761132, CAN. 0949120, FRA. 7047699, GRB. 1340207, ITL. 0914069, JAP. 0770143, MEX. 0119757, VZL. 0032600.

Class 30I

3,556,783.—COLOR MANIFOLD IMAGING PROCESS. JAN. 19, 1971.

3,853,555.—METHOD OF COLOR IMAGING A LAYER OF ELECTRICALLY PHOTOSENSITIVE AGGLOMERATES. DEC. 10, 1974.

3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.

Class 31

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

4,078,923.—MIGRATION IMAGING WITH SURFACTANT-MODIFIED SOLVENT DEVELOPMENT. MAR. 14, 1978.

4,123,283.—SETTING ELECTRICAL LATENT IMAGES IN MIGRATION IMAGING ELEMENTS. OCT. 31, 1978. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

4,135,926.—MIGRATION IMAGING PROCESS IN WHICH LATENT IMAGE IS SET. JAN. 23, 1979. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

Class 31A

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

4,040,826.—IMAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER. AUG. 2, 1977.

4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.

4,157,259.—ERASURE IN MIGRATION IMAGING SYSTEM. JUNE 5, 1979. BEL. 827065. GRB. 1497825.

Class 31B

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458, ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

3,542,465.—CAMERA WITH DEVELOPMENT MEANS. NOV. 24, 1970. CAN. 0918739, GRB. 1241846, JAP. 0650672.

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,951,324.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. APR. 20, 1976. FRA. 7439865.

4,025,183.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. MAY. 24, 1977. FRA. 7439865.

Class 31C

3,556,781.—MIGRATION IMAGING PROCESS. JAN. 19, 1971. ARG. 0175887, AUS. 0425096, BEL. 0722718, CAN. 0874909, CHL. 0024333, FRA. 1587222, GER. 1804475, GRB. 1250526, GUA. 0002124, ITL. 0855511, MEX. 0103409, PNM. 0001949, PRU. 0010349, SPN. 0359501, STZ. 0506818, SWD. 0340750, URG. 0009365, VZL. 0023713.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYR AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

3,656,990.—ELECTROSOLOGRAPHY. APR. 18, 1972. ARG. 0152723, BRA. 0084169, CAN. 0800550, CHL. 0025766. CLB. 0014944, MEX. 0086246, PNM. 0002518, PRU. 0009465, URG. 0008153, VZL. 0023999.

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.

3,713,818.—MIGRATION IMAGING SYSTEM WITH MOLTEN LIQUID DEVELOPMENT. JAN. 30, 1973. CAN. 0933580, GRB. 1358566, USR. 0463275.

3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.

3,720,513.—MIGRATION IMAGING METHOD INVOLVING SOLVENT WASH-AWAY OF UNMIGRATED PARTICLES. MAR. 13, 1973.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277, GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,798,030.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD UTILIZING POWDER PARTICLES. MAR. 19, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,362.—IMAGING METHOD. SEPT. 17, 1974.

3,839,030.—MIGRATION IMAGING PROCESS WITH UNIFORM EXPOSURE BEFORE OR DURING THE SOFTENING STEP. OCT. 1, 1974. BEL. 0715790. CAN. 0890853, FRA. 1572571, GER. 1772523, GRB. 1234652, ITL. 0834777, JAP. 0620888.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,840,397.—PARTICLE PLACING SYSTEM. OCT. 8, 1974. ARG. 0175888, ATR. 0300561, AUS. 0427473, BEL. 0724135, CAN. 0868305, DNK. 0126727, FRA. 1593258, GER. 1810079, GRB. 1254448, ITL. 0948025, JAP. 0708364, LXB. 0057367, MEX. 0107468, NOR. 0127216, NZL. 0154542, PNM. 0002048, PTG. 0050687, SAF. 0687633, SPN. 0360458, STZ. 0501251, SWD. 0341724, VZL. 0023710.

3,866,236.—IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION. FEB. 11, 1975. CAN. 0936735, GRB. 1360623.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.

3,901,699.—MIGRATION AND AGGLOMERATION IMAGING METHOD. AUG. 26, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.

3,917,880.—ELECTROPHOTETIC IMAGING SYSTEM. NOV. 4, 1975. GRB. 1459468.

3,918,969.—MIGRATION IMAGING METHOD EMPLOYING A UNIFORM EXPOSURE STEP. NOV. 11, 1975. ARG. 0172557, ATR. 0300565, AUS. 0430615, BEL. 0726282, CAN. 0883748, DNK. 0124046, FRA. 1598888, GER. 1817222, GRB. 1257030, ITL. 0850166, JAP. 0665999, LXB. 0057692, MEX. 0107941, NOR. 0127264, NZL. 0154930. PNM. 0001958, SAF. 0688516, SPN. 0362041, STZ. 0506822, SWD. 0340953, VZL. 0023721.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,950,167.—IMAGING SYSTEM. APR. 13, 1976. FRA. 7432507.

3,960,555.—PROCESS-PESO WITH CONDUCTORLESS BASE. JUNE 1, 1976. BEL. 0713103, BRA. 0088021, CAN. 0890858, CHL. 0023981, FRA. 1576403, IND. 0115236, ITL. 0829694, LXB. 0055807, MEX. 0096676, PRU. 0009941, SAF. 68/2105, SPN. 0352317, URG. 0009135, VZL. 0023691.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,967,959.—MIGRATION IMAGING SYSTEM. JULY 6, 1976.

3,970,453.—IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER. JULY 20, 1976.

3,975,739.—MIGRATION IMAGING SYSTEM USING SHAPED ELECTRODE. AUGUST 17, 1976.

3,976,483.—FRASING PROCESS - XDM LATENT IMAGE ERASING. AUG. 24, 1976. ARG. 0184682, AUS. 0458164, BEL. 0761130, CAN. 0946911, FRA. 7047697, GRB. 1339715, ITL. 0914071, JAP. 0770138, MEX. 0119758, VZL. 0032932.

3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.

3,982,936.—DEFORMATION IMAGING SYSTEM. SEPT. 28, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.

4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.

4,021,110.—PHOTOCOPYING CAMERA AND PROCESSING DEVICE. MAY 3, 1977.

4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

4,055,418.—MIGRATION IMAGING METHOD USING AN IMAGING MEMBER EMPLOYING A SURFACE SKIN. OCT. 25, 1977.

4,081,273.—MIGRATION IMAGING METHOD. MAR. 28, 1978.

4,084,966.—IMAGING SYSTEM USING AGGLOMERABLE MIGRATION MARKING MATERIAL. APR. 18, 1978.

4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

4,123,283.—SETTING ELECTRICAL LATENT IMAGES IN MIGRATION IMAGING ELEMENTS. OCT. 31, 1978. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

4,135,926.—MIGRATION IMAGING PROCESS IN WHICH LATENT IMAGE IS SET. JAN. 23, 1979. AUS. 482769. BEL. 813501. CAN. 1037546. FRA. 7412476. GRB. 1471385. ITL. 1009714. MEX. 136227.

Class 31D

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC.

0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, MEX. 0106441, SPN. 0379204, SWD. 0335063, USR. 0448658. VZL. 0029780.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,740,223.—MIGRATION IMAGING STRUCTURE. JUNE 19, 1973. BRA. 6897135, CAN. 0855151, MEX. 0100800, PNM. 0002192, PRU. 0009484, VZL. 0032425.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843. BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,901,702.—MIGRATION IMAGING ELEMENT WITH ABSORBENT BLOTTER OVERLAYER. AUG. 26, 1975. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

3,998,635.—IMAGING SYSTEM. DEC. 21, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.

4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

4,040,826.—IMAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER. AUG. 2, 1977.

4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.

4,072,517.—MIGRATION IMAGING METHOD. FEB. 7, 1978.

4,081,273.—MIGRATION IMAGING METHOD. MAR. 28, 1978.

4,102,682.—IMAGING MEMBER. JULY 25, 1978.

4,157,259.—ERASURE IN MIGRATION IMAGING SYSTEM. JUNE 5, 1979. BEL. 827065. GRB. 1497825.

Class 31E

3,598,644.—IMAGING MEMBER FABRICATION. AUG. 10, 1971.

3,671,282.—METHOD OF MAKING AN IMAGING MEMBER. JUNE 20, 1972. BEL. 0755384, FRA. 7031999, GRB. 1326056, ITL. 0901735.

3,971,334.—COATING DEVICE. JULY 27, 1976.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.

4,157,259.—ERASURE IN MIGRATION IMAGING SYSTEM. JUNE 5, 1979. BEL. 827065. GRB. 1497825.

Class 31F

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.

3,780,307.—LIQUID CRYSTALLINE COMPOSITIONS HAVING INDUCED OPTICAL ACTIVITY. DEC. 18, 1973. CAN. 1000484, GRB. 1408059.

3,909,262.—IMAGING MIGRATION MEMBER EMPLOYING A GELATIN OVERCOATING. SEPT. 30, 1975.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

4,065,307.—IMAGED AGGLOMERABLE ELEMENT AND PROCESS OF IMAGING. DEC. 27, 1977. CAN. 929350, GRB. 1330518.

4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31G

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,741,758.—MIGRATION IMAGING EMPLOYING PRESSURE NIP DEVELOPMENT. JUNE 26, 1973.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141. JAP. 0766711.

3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.

3,876,445.—MIGRATION IMAGING BY SPLITTING A SOFTENABLE MATERIAL. APR. 8, 1975. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.

4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.

4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

4,055,418.—MIGRATION IMAGING METHOD USING AN IMAGING MEMBER EMPLOYING A SURFACE SKIN. OCT. 25, 1977.

4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31H

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277. GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

Class 31I

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 31J

3,648,607.—IMAGING SYSTEM-MASTER MAKING BY BINDER PESO. MAR. 14, 1972. CAN. 0920410, GRB. 1322946, JAP. 0770136.

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

Class 31K

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.
3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 31L

3,615,394.—METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE. OCT. 26, 1971.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360. ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 32

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,746,622.—COMPOSITION AND PROCESS. JULY 17, 1973. BEL. 0783439, CAN. 0986046, FRA. 7216331, MEX. 0132353, GRB. 1388725, ITL. 0965051, SAF. 7213163, STZ. 0590297.
3,774,592.—METHOD FOR PROVIDING AN IMPROVED BODY ELECTRODE ELECTRICAL CONNECTION. NOV. 27, 1973.
3,884,685.—LOW DENSITY PAPER USED IN TRANSFER ELECTROPHOTOGRAPHY. MAY 20, 1975. ARG. 0185573, ATR. 0314353, AUS. 0463544, BEL. 0768990, CAN. 9780051, CHL. 0027015, FRA. 7124553, GRB. 1353372, ITL. 0931092, MEX. 0124810, NOR. 0134805, NZL. 0164088, PNM. 0002462, SPN. 0392720, SWD. 0368995.
3,891,990.—IMAGING PROCESS USING DONOR MATERIAL. JUNE 24, 1975. GRB. 1459468.
3,946,172.—A LATCHING APPARATUS. MAR. 23, 1976. GRB. 1429530.
3,946,401.—ELECTROTHERMOGRAPHIC IMAGE PRODUCING TECHNIQUES. MAR. 23, 1976.
3,952,798.—INTERNALLY HEATED HEAT PIPE ROLLER-INTERNALLY HEATED HEAT PIPE. APR. 27, 1976. CAN. 0968341. GRB. 1368100.
3,971,950.—INDEPENDENT COMPRESSION AND POSITIONING DEVICE FOR USE IN MAMMOGRAPHY. JULY 27, 1976.
3,975,681.—ELECTRODE FOR MEASURING THICKNESS OF DIELECTRIC LAYERS ON CONDUCTIVE SUBSTRATES. AUG. 17, 1976.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,997,498.—NON-SMUDGE CORRECTION FLUID. DEC. 14, 1976.
4,010,366.—MEASUREMENT OF THE MASS & CHARGE OF CHARGED CIRCUITS. MAR. 1, 1977.
4,018,953.—COATING METHOD. APR. 19, 1977.
4,020,210.—ENCAPSULATED WATER. APR. 26, 1977.
4,020,268.—AGAROSE CONTAINING AFFINITY MATRIX MATERIALS. APR. 26, 1977. BEL. 0783439, CAN. 0986046, FRA. 7216331, GRB. 1388725, ITL. 0965051, MEX. 0132353, SAF. 7213163, STZ. 0590297.
4,046,404.—CARBONLESS PAPER FOR USE IN ELECTROSTATOGRAPHIC COPIERS. SEPT. 6, 1977.
4,046,473.—PHOTORECEPTOR METHOD AND SYSTEM. SEPT. 6, 1977.
4,047,973.—RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HYDRAULIC LATHING. SEPT. 13, 1977.
4,059,353.—PHOTORECEPTOR BELT SYSTEM. NOV. 22, 1977.
4,074,000.—PRESSURE SENSITIVE ADHESIVE DRAFTING FILMS FOR USE IN ELECTROSTATOGRAPHIC COPIERS. FEB. 14, 1978.
4,085,245.—TRANSPARENCIES FOR COLOR XEROGRAPHIC COPIES. APR. 18, 1978.
4,097,267.—PURIFICATION AND REALLOYING OF ARSENIC/SELENIUM ALLOYS. JUNE 27, 1978.
4,097,273.—ARSENIC/SELENIUM RECOVERY. JUNE 27, 1978.
4,143,118.—APPARATUS AND METHOD FOR OZONE REDUCTION IN ELECTROSTATOGRAPHIC REPRODUCTION EQUIPMENT. MAR. 6, 1979.
4,161,362.—DOCUMENT CODING. JULY 17, 1979.

Class 32A

3,132,972.—ENERGY CONVERSION CELL. MAY 12, 1964.
3,231,426.—CONTINUOUS CONCENTRATION CELL. JAN. 25, 1966.
3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

Class 32B

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,354,644.—LIQUID PROTECTION OF ELECTRODES. NOV. 28, 1967.
3,372,860.—CORRESPONDENCE PIECE. MAR. 12, 1968.
3,453,752.—ANSWER COMPARISON DEVICE. JULY 8, 1969.
3,483,777.—INFORMATION STORAGE AND RETRIEVAL EMPLOYING THERMAL PERFORATION OF THE RECORD MEMBER. DEC. 16, 1969. CAN. 0811566.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,510,210.—COMPUTER PROCESS CHARACTER ANIMATION. MAY 5, 1970.
3,552,562.—RANDOM ACCESS RETRIEVAL SYSTEM. JAN. 5, 1971.
3,577,203.—CHARACTER RECORDING AND RECOGNITION SYS. MAY 4, 1971.
3,635,789.—DRINKING OF WASTE XEROGRAPHIC COPY PAPER - REMOVAL OF XEROX TONER FROM COPY PAPER. JAN. 18, 1972.
3,645,048.—ERASER FOR VELLUM XEROGRAPHIC COPY PAPER. FEB. 29, 1972. AUS. 0449216, CAN. 0933707, GRB. 1329835.
3,647,713.—NONAGGLOMERATING BLENDING PROCESS. MAR. 7, 1972. FRA. 7004722, GRB. 1302409, JAP. 0661186.
3,648,387.—EDUCATIONAL AID. MAR. 14, 1972.
3,655,379.—PRINTING BY VAPOR PROPULSION. APR. 11, 1972. BEL. 0758057, CAN. 0929351, FRA. 7041621, GRB. 1333783, ITL. 0916693.
3,708,287.—OIL FILM IMAGING. JAN. 2, 1973.
3,713,861.—INHIBITOR DEVICE. JAN. 30, 1973. CAN. 0917701, GRB. 1338893, JAP. 0727989.
3.748,090.—EVAPORATION CRUCIBLE. JULY 24, 1973.
3,771,084.—MAGNETIC RETRIEVAL DEVICE. NOV. 6, 1973.
3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 0930693.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,812,905.—DYNAMIC BARRIER FOR HEAT PIPE. MAY 28, 1974.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,845,739.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. NOV. 5, 1974. BEL. 0798324, GRB. 1428703.

3,861,202.—METHOD OF DETECTING PRESSURE UNIFORMITY. JAN. 21, 1975.
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DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 6, 1979

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T988,001
DIFFERENTIAL ACTION EXTRACTOR COMB

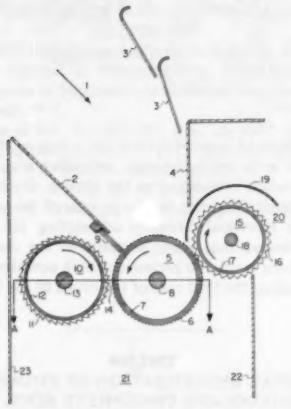
Lowrey A. Smith, Auburn, Ala., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 844,336, Sep. 22, 1978, abandoned. This application Sep. 22, 1978, Ser. No. 944,678

Int. Cl.[2] D01B *3/00*

U.S. Cl. 19—203

3 Sheets Drawing. 14 Pages Specification



This invention relates to a unique method of combing stripper harvested seed cotton in order to facilitate the removal of trash components such as large sticks and burrs.

Further it relates to a coarse-tooth, reverse pitch, combing saw cylinders, turning with opposite rotation to a fine-toothed combed saw cylinder such that the saw teeth on the adjacent side of the two cylinders move in the same direction without overlap.

Further it relates to the combing action of two adjacent saw cylinders of the same nominal diameter operating at different speeds such that sticks, burrs, and other large trash components are held momentarily by the slower rotating teeth of the combing cylinder as the seed-cotton attached to the combed cylinder passes through the combing area between the cylinders. The large sticks and burrs are loosened or detached from the seed cotton by the combing action to facilitate their separation from the seed cotton by either centrifugal sling off from the combed cylinder or by subsequent processing through a conventional stick machine composed of a single saw cylinder partially surrounded by concentrically spaced grid bars.

T988,002
APPARATUS FOR FORMING A VACUUM EVAPORATING LAYER ON A SUBSTRATE

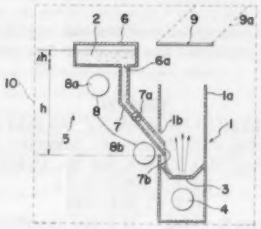
Kazuo Ohta, Nishinomiya, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 821,929, Aug. 3, 1977, abandoned. This application Aug. 7, 1978, Ser. No. 931,441

Int. Cl.[2] C23C *13/08*

U.S. Cl. 118—719

3 Sheets Drawing. 26 Pages Specification



An evaporator element is positioned within a hermetic enclosure having therein a desired atmosphere. A supply receptacle containing a source material is located at a position higher than the evaporator element. A source material heater is positioned adjacent the supply receptacle for melting the source material. A duct is inclined from the supply receptacle to the evaporator element to substantially continuously supply molten source material from the supply receptacle to the evaporator element. An evaporation heater adjacent the evaporator element substantially momentarily evaporates the molten source material as it is supplied to the evaporator element, without any substantial accumulation of the molten source material in the evaporator element. A substrate is positioned so as to have deposited thereon a layer of source material evaporated from the evaporator element.

T988,003
PROCESS FOR RECOVERING LEAD FROM DISCARDED BATTERIES

Hubert H. Dreissen, St. Jansstraat 16, Geleen, Netherlands

Continuation of Ser. No. 896,022, Apr. 12, 1978, abandoned. This application Dec. 1, 1978, Ser. No. 965,238

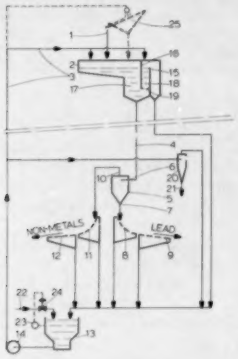
Int. Cl.[2] B03B *5/34*

U.S. Cl. 209—211

1 Sheets Drawing. 13 Pages Specification

A process is disclosed for recovering lead from discarded storage batteries which have been crushed or ground to obtain a particulate scrap, wherein the lead is separated from non-metallic components, which are mainly plastics and suchlike from the battery casings and separators, in a hyrocyclone having a relatively large top angle of the conical part and using water as the separating medium. A scrap-water mixture is fed to the hydrocyclone and a predominantly lead-containing portion is discharged from the apex area of the hydrocyclone,

while a predominantly non-metal containing portion is discharged from the overflow area of the cyclone. The water is

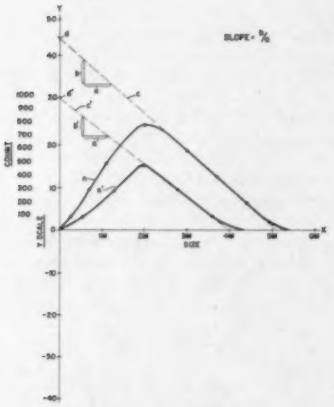


drained from the separated portions and recycled; part of the recycled water is cleaned in a second hydrocyclone.

T988,004
METHOD OF ANALYZING DATA

Ronald G. Nations, 4539 Preston Dr., Kingsport, Tenn. 37664

Filed Mar. 1, 1979, Ser. No. 16,463
Int. Cl.[2] G06F *15/36*
U.S. Cl. 364—554
4 Sheets Drawing. 22 Pages Specification



Disclosed is a method for obtaining useful information from a collection of data in which a measured quantity is related to a physical property comprising the steps of

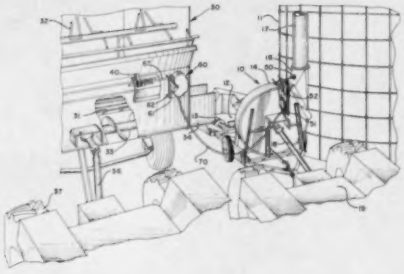
(a) measuring a physical property such as size of a multiplicity of objects,
(b) classifying the measurements into ranges according to relative value,
(c) counting the number of units within each classification range,
(d) plotting the data according to count of each classification,
(e) forming a line representing the plotted data, and
(f) measuring the slope and intersect of a selected segment of the line to obtain useful information concerning the relationship between the measured quantity and physical property.

The method is useful for obtaining size and count of gel particles in a cellulose ester spinning solution and is carried out with a schlieren optical system, television camera, and digital computer.

T988,005
AUTOMATIC FEED CONTROL SYSTEM

N. Donald Patterson, Woodford, Va.; Anthony J. Falanga, Lemont; Edward J. Johnston, La Grange Park, and Thomas J. Scarnato, Barrington, all of Ill., assignors to International Harvester Company, Chicago, Ill.

Continuation of Ser. No. 666,729, Mar. 15, 1976, abandoned.
This application Oct. 5, 1978, Ser. No. 948,716
Int. Cl.[2] B65G *53/66*
U.S. Cl. 406—30
3 Sheets Drawing. 16 Pages Specification

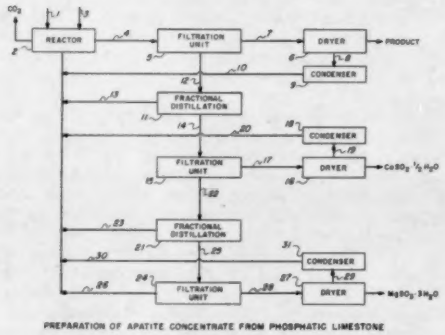


An automatic feed control system for a forage blower of the type adapted to be fed by a forage unloading wagon including a pressure switch connected to the blower discharge pipe, a device for controlling the discharge rate of the wagon to the blower, and electrical circuitry connecting the switch and control device so that when pressure in the discharge pipe exceeds a given level, the pressure switch actuates the control device to reduce the feed rate of the crops to the blower from the wagon.

T988,006
CHEMICAL BENEFICIATION OF PHOSPHATIC LIMESTONE AND PHOSPHATE ROCK WITH α-HYDROXYSULFONIC ACIDS

John F. Phillips, Jr., Florence; Guerry H. McClellan, Killen, and John F. McCullough, Florence, all of Ala., assignors to Tennessee Valley Authority

Filed Sep. 11, 1978, Ser. No. 940,940
Int. Cl.[2] C01F *5/42, 11/48*
U.S. Cl. 423—167
1 Sheets Drawing. 50 Pages Specification



PREPARATION OF APATITE CONCENTRATE FROM PHOSPHATIC LIMESTONE

A method of selectively extracting calcite and dolomite away from apatite in phosphate rock or phosphatic limestone wherein the phosphate rock or phosphatic limestone is treated

with a mixture of sulfur dioxide, water, and a carbonyl compound. Solids are separated from the liquid phase. The solids consist principally of apatite admixed with clay, quartz, and other accessory minerals originally in the rock. The solids are heated to drive off adhering sulfur dioxide, water, and carbonyl. The liquid phase consists of carbonyl, water, sulfur dioxide, and magnesium and calcium ions. Heating this liquid preferentially precipitates $CaSO_3.\frac{1}{2}H_2O$. This solid is filtered off and the filtrate further heated to precipitate $MgSO_3.3H_2O$ largely free of $CaSO_3.\frac{1}{2}H_2O$. All offgas and filtrate is returned to the process. Examination of extraction results shows that high temperature extraction favors dolomite extraction and low temperature extraction favors apatite extraction. Thus, operating at elevated temperature allows dolomite to be selectively extracted from the apatite in phosphate rock.

T988,007

LASER DEPOSITION OF METAL UPON TRANSPARENT MATERIALS

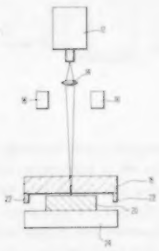
Roland F. Drew, Poughkeepsie; Frank J. Schmidt, Jr., Highland Falls, and Thomas J. Vanduynhoven, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 862,797, Dec. 21, 1977, abandoned. This application Feb. 5, 1979, Ser. No. 9,704

Int. Cl.[2] **B05D** *3/06*

U.S. Cl. 427—53.1

1 Sheets Drawing. 11 Pages Specification



The present invention contemplates a method and apparatus for selectively depositing metal or other materials upon a transparent substrate utilizing a laser source. More particularly, the invention contemplates depositing material in highly selective areas with a high degree of adhesion and uniformity. The invention attains these results with an arrangement wherein a laser source **12** is located on one side of a transparent or translucent substrate **18** upon which metal is to be deposited, so that the laser beam can be directed through the substrate. A reservoir **20** of metal is located on supports **24** on the opposite side of the substrate adjacent to the surface thereof. Deflection means **14, 16** are provided to selectively scan the laser beam at predetermined intensity levels over a desired pattern.

The scanned laser beam acts to heat and vaporize metal from the metal reservoir, which is then redeposited upon the adjacent surface of the glass substrate. It has been found that with transparent substrates, metal and particularly conductive metal can be redeposited upon one surface thereof using this method with a high degree of adhesion and uniformity.

T988,008

COATING AGENTS COMPRISING FLUOROTERPOLYMERS AND POLYARYLENE SULFIDE RESINS

Franz Mayer, and Gerhard Gebauer, both of Hoechst Aktiengesellschaft, D-6230 Frankfurt am Main 80, Fed. Rep. of Germany

Filed Jan. 2, 1979, Ser. No. 161

Int. Cl.[2] **C08L** *57/08, 65/02, 81/04*

U.S. Cl. 525—537

No Drawing. 16 Pages Specification

Coating composition comprising (a) from 98 to 20% by weight of a poly(arylene sulfide) resin, having preferably a melting point between 204° C. and 482° C. and an inherent viscosity from 0.1 to 0.3, determined in chloronaphthalene at 206° C., (b) from 20 to 80% by weight of a terpolymer which contains in copolymerized form 0.5 to 12% by weight of hexafluoropropene, 0.5 to 11% by weight of perfluoro(alkyl vinyl ether), preferably perfluoro(propyl vinyl ether), and tetrafluorethylene, and (c) 40 to 95% by weight, calculated on the total weight of the composition, of a liquid carrier, which is a glycol or glycol ether, an aprotic polar or a non-polar organic solvent or preferably water. Anionic or non-ionic dispersing agents, fillers, pigments and thickeners may optionally be included. Preferred is poly(phenylene sulfide) which is mixed with the liquid carrier and then with the terpolymer in dispersion, suspension or powder form. Compositions are useful for coating metals or non-metallic substrates such as glass or porcelain. Improved adhesion is obtained without pretreating the substrate or without special ingredients. The coating is applied by spraying, dipping or brushing with subsequent heat-treatment.

T988,009

VINYL CHLORIDE POLYMERIZATION PROCESS

William E. Andrew, Hertford, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 576,575, May 12, 1975, abandoned. This application Jan. 19, 1979, Ser. No. 5,024

Claims priority, application United Kingdom, May 30, 1974, 24073/74

Int. Cl.[2] **C08F** *2/26, 2/20, 14/06*

U.S. Cl. 526—345

No Drawing. 19 Pages Specification

Vinyl chloride is polymerized by suspension or homogenized dispersion polymerization using a free radical-yielding initiator in which 0.02% by weight, based on the weight of vinyl chloride, of at least one α-olefin having from 6 to 20 carbon atoms is added to the vinyl chloride either (a) prior to the start of polymerization in the case of homogenized dispersion polymerization, or (b) prior to the start of or during the polymerization, but in any event before the onset of autoacceleration in the case of suspension polymerization. The disclosed process avoids or reduces the tendency of the vinyl chloride to undergo autoacceleration during the polymerization.

Preferably the amount of α-olefin employed is 0.03% to 0.075% by weight, particularly 0.03% to 0.06% by weight. The α-olefin preferably contains 8 to 20 carbon atoms; suitable α-olefins include octene-1, nonene-1, decene-1, dodecene-1, tetradecene-1, hexadecene-1, octadecene-1, and eicosene-1.

T988,010

PROCESS FOR PREPARING C_1–C_5 ALKYL 5-(SUBSTITUTED-PHENOXY)-2-NITROBENZOATE

Theresa L. Cunningham, Jackson, and Clifford E. Hunt, Somerset, both of N.J., assignors to Mobil Oil Corporation, N.Y.

Continuation-in-part of Ser. No. 903,275, May 5, 1978, abandoned. This application Mar. 2, 1979, Ser. No. 16,851

Int. Cl.[2] **C07C** *79/46*

U.S. Cl. 560—21

No Drawing. 10 Pages Specification

A process of preparing C_1–C_5 alkyl 5-(substituted-phenoxy)-2-

nitrobenzoate such as a process for preparing methyl 5-(2',4'-dichlorophenoxy)-2-nitrobenzoate by the coupling reaction of methyl 2-nitro-5-chlorobenzoate with the potassium salt of 2,4-dichlorophenol in dimethylformamide solvent to produce a reaction product mixture containing desired ester product and byproduct potassium 5-(2',4'-dichlorophenoxy)-2-nitrobenzoate. The yield of desired ester product is increased by a process that comprises reacting said reaction product mixture in situ, with methyl chloride at a pressure of about 440 mm. Hg. to about 50 psig., for between about 0.5 hour and about 4 hours, and at a temperature between about 75° C. and about 105° C. In a specific embodiment the process is carried out on bench scale at a temperature of between about 75° C. and about 100° C. and at a pressure of between about 10 psig. and about 50 psig. In another specific embodiment the process is carried out on plant scale at a temperature of between about 75° C. and about 105° C. and at a pressure of between about 440 mm. Hg. and about 760 mm. Hg.

REISSUES

NOVEMBER 6, 1979

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

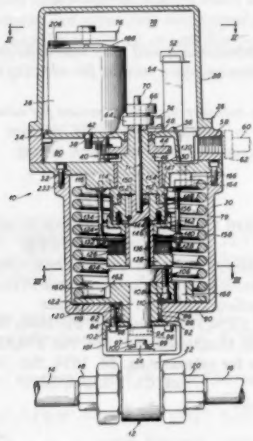
Re. 30,135
ELECTRIC FAIL-SAFE ACTUATOR

John H. Fitzwater, deceased, late of Warwick, R.I., and by Amelia Fitzwater, executrix, Warwick, R.I., assignor to Amelia Inc., Warwick, R.I.

Original No. 3,808,895, dated May 7, 1974, Ser. No. 331,191, Feb. 9, 1973. Application for reissue Oct. 29, 1975, Ser. No. 626,723

Int. Cl.[2] F16H *5/40*; G01G *17/00*

U.S. Cl. 74—2 **19 Claims**



32. An electrically operated valve actuator, comprising:

an electric motor for connection to an electrical supply;

means for connecting said motor to a valve for driving the valve in one direction, including electric clutch means for connection to the electrical supply and normally energized to connect said motor in driving engagement with the valve and deenergized in response to loss of power from the electrical supply to disengage the valve from said motor;

energy storage means for connection to the valve responsive to the operation of said motor to store energy and responsive to disengagement of said motor from the valve to drive the valve in the opposite direction;

switch means operated in response to a predetermined number of revolutions of said motor to disconnect said motor from the electrical supply; and

brake means operated in response to the operation of said switch means to hold the valve in the position driven by said motor,

said electric clutch means including a pair of axially aligned shaft means, an electromagnetic coil disposed about one of said shaft means, a clutch armature disposed about said one shaft means and axially movable toward the other shaft means, a torsion spring disposed about said other shaft means and having one end connected to said other shaft means and the other end disposed adjacent said armature, and means on said armature for gripping the other end of said torsion spring to cause a tightening of said torsion spring about said pair of shaft means to couple said shaft means together when said electric motor is energized to drive the valve.

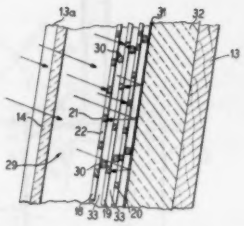
Re. 30,136
SOLAR PANEL

Arno H. Schriefer, Jr., R.R. #1, Dewey, Ill. 61840

Original No. 4,073,282, dated Feb. 14, 1978, Ser. No. 723,987, Sep. 16, 1976. Application for reissue May 25, 1978, Ser. No. 909,719

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—441 **8 Claims**



1. In a solar collector having a housing, a front transparent panel to allow solar energy to pass into the housing, a back panel, and means for delivering forced fluid into and out of the housing, the improvement comprising:

a matrix of multiple layers of [a black] *an absorbtive* coated sheet, each layer having a plurality of open meshes, defined by a closed loop, each loop having a raised side portion and a lowered side portion, and all said raised portions being regularly repeated along a unidirectional line, said unidirectional line in one sheet positioned at *multiples of* 90° relative to a unidirectional line in an adjoining sheet of the matrix, and

a reflective surface within the housing at said back panel, said reflective surface spaced from said matrix.

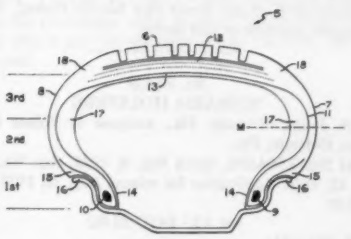
Re. 30,137
HIGH-MODULUS RUBBER COMPOSITION FOR PNEUMATIC TIRES

James W. Messerly, Stow, Ohio, assignor to The B. F. Goodrich Co., Akron, Ohio

Original No. 3,983,919, dated Oct. 5, 1976, Ser. No. 513,414, Oct. 9, 1974. Application for reissue Jun. 19, 1978, Ser. No. 916,699

Int. Cl.[2] B60C *9/02*; C08K *3/04*; C08L *91/00*

U.S. Cl. 152—357 R **10 Claims**



1. A *tire with a sidewall comparable in thickness to the tread, which sidewall in a major part of its thickness is made of a* high-modulus, low-hysteresis, stable, vulcanized, tire composition consisting essentially of vulcanized cis-polyisoprene rubber containing a high-modulus carbon black, about 4 to 8 parts, per

hundred of rubber, of an active cobalt compound, and an effective quantity of an efficient antioxidant.

Re. 30,138

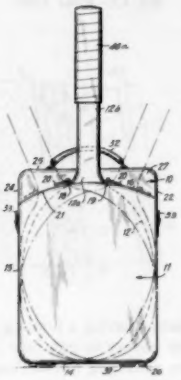
COMBINED CARRYING BAG AND RACKET CARRIER

Arthur T. Cowen, III, 20 W. 75th St., New York, N.Y. 10023

Original No. 3,963,103, dated Jun. 15, 1976, Ser. No. 539,332, Jan. 8, 1975. Application for reissue Aug. 31, 1977, Ser. No. 829,300

Int. Cl.[2] A45C *3/00*

U.S. Cl. 190—52 **8 Claims**



7. A combination carrying case for a racket and associated clothing equipment, which comprises

(a) a clothing case,

(b) a carrying handle at the top of said clothing case,

(c) a racket case secured to and extending from one side of said clothing case,

(d) said racket case being substantially in the form of an open top pocket having width dimensions generally corresponding to the width of a racket head to be carried therein, and having a height dimension generally corresponding to the height of the racket head up to its throat area,

(e) said pocket having a top opening extending across the top of said pocket,

(f) a single, continuous zipper track extending across the full width of said top opening,

(g) a double zipper closure for said top opening, comprising a pair of oppositely disposed, independently movable zipper slides on said continuous zipper track,

(h) said top opening being so arranged and spaced from the bottom of said pocket that, when a racket is placed head down in said pocket, said zipper slides may be closed toward said racket to provide support for said racket on both sides, in the general area of the throat and handle thereof, in various angular positions of said racket.

Re. 30,139

SIDEARM HOLSTERS

H. Jack Jones, Orlando, Fla., assignor to Wilma Catherine Jones, Orlando, Fla.

Original No. 3,904,091, dated Sep. 9, 1975, Ser. No. 505,684, Sep. 13, 1974. Application for reissue Aug. 26, 1977, Ser. No. 828,160

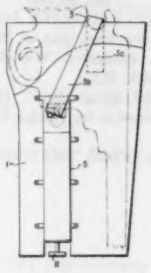
Int. Cl.[2] F41C *33/02*

U.S. Cl. 224—243 **8 Claims**

7. In a sidearm holster having a closing member disposed to extend over the top of a sidearm held in the holster and movable into a closed position for keeping the sidearm in the holster, and into an open position for permitting withdrawal of the sidearm, the improvement comprising:

latch means carried by said closing member near the end thereof which, when said closing member is in its closed position, is adjacent one side of said holster;

a manually operable latching mechanism mounted on said holster for holding said latch means when said closing member is in its closed position, said latching mechanism comprising a pushbutton disposed to be manually pushed for moving said mechanism into a position for releasing said latch means; and



said closing member including means for causing said closing member to spring into its open position, and to remain therein, upon release of said latch means.

Re. 30,140

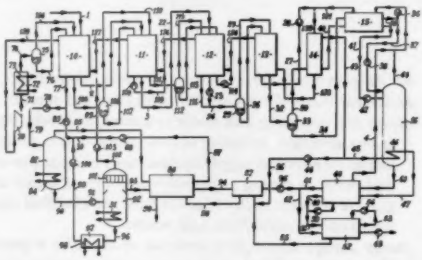
METHOD FOR COOLING A GASEOUS MIXTURE TO A LOW TEMPERATURE

Maurice Grenier, Paris, and Pierre Petit, Chatenay Malabry, both of France, assignors to Compagnie Francaise d'Etudes et de Construction Technip, Paris, France

Original No. 3,274,787, dated Sep. 27, 1966, Ser. No. 484,541, Sep. 2, 1965. Continuation of Ser. No. 273,338, Jul. 19, 1972. Application for reissue Aug. 28, 1974, Ser. No. 501,246

Int. Cl.[2] F25J *3/02*

U.S. Cl. 62—28 **2 Claims**



8. A method for cooling a second gaseous mixture to low temperature and producing at least one constituent of said mixture in liquid phase, comprising:

a. cooling and subjecting a first gaseous mixture containing at least one component of said second gaseous mixture, to a fractionate condensation under a first pressure,

b. expanding at least two condensed fractions obtained during the fractionate condensation of said first gaseous mixture, reuniting the expanded condensed fractions with said first gaseous mixture under a second pressure lower than said first pressure, vaporizing and reheating the reunited fractions with said first gaseous mixture under said second pressure, by heat exchange with said second gaseous mixture undergoing cooling, and with said first gaseous mixture undergoing fractionate condensation, and recompressing said first gaseous mixture to said first pressure,

c. reuniting under said first pressure said second gaseous mixture undergoing cooling with said first gaseous mixture un-

dergoing fractionate condensation, when said gaseous mixture is in conditions of temperature and pressure such that a major portion of said constituent to be produced in liquid phase is condensed within said second gaseous mixture, and after the first condensed fraction of said first gaseous mixture has been withdrawn for expansion and vaporization, continuing the fractionate condensation of the mixture so obtained under said first pressure until there is obtained a last condensed fraction containing a major part of said constituent to be produced in liquid phase,

d. expanding to said second pressure the last condensed fraction, and separating the last expanded fraction into a liquid portion expanded to a pressure lower than said second pressure and a residual gaseous portion for recompression with said first gaseous mixture, and withdrawing said last expanded liquid portion as a product stream, and

e. prior to reuniting said first gaseous mixture and said second gaseous mixture, condensing at least partially said second gaseous mixture under a third pressure which is higher than said first pressure, and expanding said second gaseous mixture at least partially condensed to said first pressure.

Re. 30,141

INORGANIC VITREOUS DETECTOR MATERIAL

Hans-Herbert Kaes, Darmstadt, Fed. Rep. of Germany, assignor to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Original No. 3,947,282, dated Mar. 30, 1976, Ser. No. 424,618, Dec. 13, 1973. Application for reissue Dec. 5, 1978, Ser. No. 966,825

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1972, 2262073

Int. Cl.[2] **C03C** *3/08, 3/16;* **G01T** *5/10*

U.S. Cl. 106—54 **4 Claims**

1. An inorganic vitreous detector material having the properties of excellent energy resolution for impinging heavy ions and fission products, a high dependence of specific hole diameter with respect to impinging particle energy and as being substantially insensitive to background electrons and gamma-rays, said material consisting essentially of:

a. silicon dioxide SiO_2 and boron trioxide B_2O_3 in an amount not exceeding about 10% by weight; and

b. the balance, a three-component basic system consisting essentially of metaphosphoric acid, aluminum metaphosphate and zinc oxide within the following concentration limits:

about 20 to 60% by weight of metaphosphoric acid HPO_3,

about 30 to 80% by weight of aluminum metaphosphate $Al(PO_3)_3$, and

about 2 to 30% by weight of zinc oxide ZnO.

Re. 30,142

PHOSPHORUS, NITROGEN AND SULFO-CONTAINING ADDITIVES

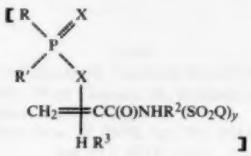
William M. LeSuer, Cleveland, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

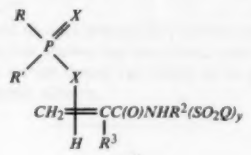
Original No. 3,926,821, dated Dec. 16, 1975, Ser. No. 424,246, Dec. 12, 1973. Application for reissue Dec. 14, 1977, Ser. No. 860,361

Int. Cl.[2] **C10M** *1/48*

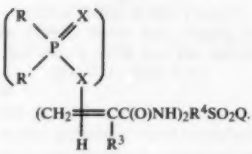
U.S. Cl. 252—46.7 **16 Claims**

1. A lubricating oil comprising a major amount of oil and a minor amount of at least one additive sufficient to impart improved load-carrying properties thereto wherein said additive is a sulfo-, nitrogen- and phosphorus-containing additive selected from those corresponding to the formulae:





and



and mixtures of two or more such additives wherein z is one or two, each X is independently oxygen or divalent sulfur, R is hydrogen or a hydrocarbyl, hydrocarbyloxy, or hydrocarbyl mercapto group of about one to about 30 carbon atoms, and R′ is XM or R, M being a hydrogen, an equivalent of a metal or ammonium cation, with the proviso that the total number of carbon atoms in both R and R′ is at least two, y is one or two, each R^3 is independently hydrogen or lower alkyl group of one to seven carbon atoms, R^2 is di- or trivalent hydrocarbyl group having one to 18 carbon atoms, R^4 is a trivalent hydrocarbyl group having one to 18 carbon atoms, and Q is selected from the group consisting of —OH, —OR^3, —OM, —O(Alkylene—O)$_n$—R^3, —$N(R^3)_2$, —NR^3 (Alkylene-NR^3)$_nR^3$, [—$OH(R^3)_4$,] —$ON(R^3)_4$ and —ONR_3-(Alkylene-NR^3)$_nR^3$, wherein n has an average value of about one to about 10, M is as defined above and the alkylene group has from one to 10 carbon atoms.

PLANT PATENTS

GRANTED NOVEMBER 6, 1979

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,475

ACALYPHA WILKESIANA 'DALLAS'

G. Philip Huey, Dallas, Tex., assignor to City of Dallas, Dallas, Tex.

Filed Jul. 20, 1978, Ser. No. 926,944

Int. Cl.[2] A01H *5/12*

U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct variety of *Acalypha wilkesiana,* substantially as shown and described, characterized by its predominantly yellow and green foliage.

4,476

CHRYSANTHEMUM NAMED SUNBURST SPIRIT

Kerry S. Petusky, West Chicago, Ill., assignor to Pan-American Plant Company, West Chicago, Ill.

Filed Nov. 27, 1978, Ser. No. 963,884

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—78 **1 Claim**

1. A new and distinctive cultivar of chrysanthemum pot plant, substantially as herein shown and described, particularly characterized in uniqueness, when compared with its parent "Spirit", by the bright yellow coloration of its bloooms, the somewhat smaller size of its flowers and its slower flowering response.

4,477

CHRYSANTHEMUM NAMED HARTMANN'S YELLOW DIGNITY

Kerry S. Petusky, West Chicago, Ill., assignor to Pan-American Plant Company, West Chicago, Ill.

Filed Nov. 28, 1978, Ser. No. 964,287

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—78 **1 Claim**

1. A new and distinct cultivar of chrysanthemum, substantially as herein shown and described, characterized by its unique yellow color when compared to the parent variety "Hartmann's Dignity".

4,478

CHRYSANTHEMUM NAMED RUFFLED SPIRIT

Kerry S. Petusky, West Chicago, Ill., assignor to Pan-American Plant Company, West Chicago, Ill.

Filed Nov. 28, 1978, Ser. No. 964,435

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—77 **1 Claim**

1. A new and distinct potted chrysanthemum cultivar, substantially as herein shown and described, particularly characterized by the serrate-tipped ray florets of its generally hemispherically shaped blooms.

4,479

MINIATURE ROSE PLANT

Ralph S. Moore, 2519 E. Noble Ave., Visalia, Calif. 93277

Filed Dec. 1, 1978, Ser. No. 965,522

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, spreading, much branched habit, substantially as illustrated and described, characterized by buds and flowers of a soft pink to rose pink color, being of a shade generally near Carmine Rose 621/1, the bud and flower resembling the variety June Time (U.S. Plant Pat. No. 2,563) in form and size; and further characterized by a plant of vigorous and compact growth habit, easy to propagate from cuttings or by budding, with an abundance of small to medium size semi-glossy foliage and an abundance of flowers borne usually in loose clusters of 3 to 5 or more.

PATENTS

GRANTED NOV. 6, 1979

ERRATA

For CLASS	See PATENT NO.
433–120	4,173,072
400–120	4,173,273
294–067 E	4,173,334
356–431	4,173,441
356–346	4,173,442
417–457	4,173,451
430–005	4,173,470
430–060	4,173,472
430–072	4,173,473
430–001	4,173,474
430–290	4,173,475
430–280	4,173,476
430–264	4,173,477
430–353	4,173,478
430–507	4,173,479
430–536	4,173,480
430–621	4,173,481
430–619	4,173,482
430–575	4,173,483
435–094	4,173,514
435–038	4,173,515
435–286	4,173,516
548–216	4,173,567
525–134	4,173,592
525–109	4,173,593
525–498	4,173,594
525–165	4,173,595
428–402	4,173,596
525–098	4,173,597
428–402	4,173,598
525–066	4,173,599
525–076	4,173,600
367–123	4,173,748
367–190	4,173,749

PATENTS

GRANTED JULY 3, 1900

52,051

PATENTS

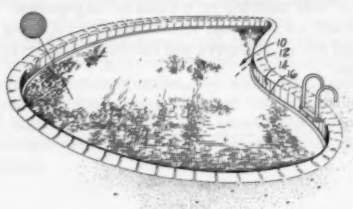
GRANTED NOVEMBER 6, 1979

GENERAL AND MECHANICAL

4,173,042
HEAD COVERING GARMENT
Henrietta Krzewinski-Morris, Old Bridge, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.
Filed Oct. 7, 1977, Ser. No. 840,358
Int. Cl.[2] A45D *8/40;* A42B *1/02*
U.S. Cl. 2—197 **13 Claims**

1. A head covering garment comprising a piece of flexible, drapable nonwoven material having a central portion and a pair of adjoining side portions; said piece of material having an upper surface, a lower surface, a top edge, a bottom edge, and a pair of opposed side edges; closure means affixed to said sheet of material in proximity to its bottom edge; one of said side portions being folded to overlie the lower surface of at least part of said central portion and the other of said side portions being folded to overlie part of said central portion and at least part of said one of said side portions; the top edge of said piece of material in its thus folded condition being gathered together and secured in its thus gathered condition by holding means located below the gathered top edge to provide a closed top, whereby there is provided a head covering garment in a generally flat and triangular configuration.

4,173,043
WIND RESISTANT FLOATABLE POOL COVER AND MANUFACTURE THEREOF
William C. Vernon, Walnut Creek, Calif., assignor to Imperial Wax and Chemical Company, Walnut Creek, Calif.
Filed Apr. 26, 1978, Ser. No. 900,176
Int. Cl.[2] E04H *3/19*
U.S. Cl. 4—172.12 **7 Claims**



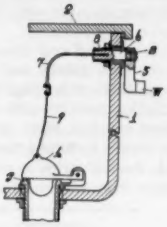
1. A cover for use with an outdoor pool containing liquid comprising:

means for blanketing a pool to prevent liquid evaporation and heat loss, the blanket means being and of a construction sufficient to be buoyantly floatable upon the liquid surface of the pool;

said blanket means comprising a relatively dark colored, water impervious upper portion and a light colored, buoyant lower portion; said blanket means having an integral peripheral edge folded upon itself and secured thereto to form integral peripheral channel means on the blanket for channeling water about the peripheral edge of said blanket; and

means on the underside of said channel means for rapidly admitting liquid into and for self-filling the channel means when the blanket means is floated upon the pool for increasing resistance to wind lift, the channel means being of a construction sufficient to be buoyantly held substantially horizontally outwardly of the blanket means when the channel means is filled with liquid and the blanket means is floating upon the liquid surface of the pool.

4,173,044
DRAIN VALVE OPERATING DEVICE FOR A CISTERN OF FLUSH TOILET
Etsuji Ota, 20-Banchi, 4-chome, Shinmachi-dori, Nishi-ku, Osaka, Japan
Filed Mar. 6, 1978, Ser. No. 883,998
Claims priority, application Japan, Mar. 7, 1977, 52-27183
Int. Cl.[2] E03D *1/14, 3/12*
U.S. Cl. 4—325 **1 Claim**



1. A drain valve operating device for a cistern of a flush toilet which has a hollow tank body, a lid on the top of said body, and a drain in the bottom of said body, said device comprising:

a rotatable spindle means mounted through the sidewall of said tank body;

an operating lever means with a weight at its free end connected to said spindle outside of said tank body;

a drain valve over said drain for opening and closing said drain;

a chain connected at one end to said drain valve; and

an L-shaped operating rod means connected at one end which is parallel to the axis of said spindle means, to said spindle inside said tank body and connected at its opposite end to said chain, said operating rod means being positioned near said lid so that rotating said spindle means in one direction causes said operating rod means to abutt said lid, and said lever means being rotatable away from the direction of contacting said lid so that said chain connected between said rod and said drain valve is pulled away from said drain valve at an angle different than the opening direction of said drain valve.

4,173,045
COMBINATION SOFA AND BED
L. Earl Osborn, 25 W. 665 Elmwood Dr., Wheaton, Ill. 60187
Filed Jun. 10, 1977, Ser. No. 805,471
Int. Cl.[2] A47C *17/04*
U.S. Cl. 5—12 R **4 Claims**

1. A combination sofa and bed, comprising

a first cushion member,

a second cushion member adapted to rest on said first cushion member,

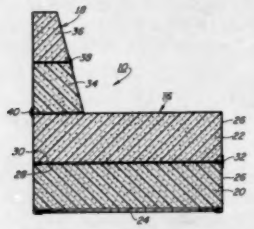
said cushion members having horizontal top and bottom

surfaces and substantially planar and vertical front surfaces,

first hinge means interconnecting the forward upper edge of said first cushion member with the forward bottom edge of said second cushion member,

a first bolster member adapted to rest on said second cushion member,

a second bolster member adapted to rest on said first bolster member with the front surfaces of said bolster members being coplanar,



second hinge means interconnecting the forward upper edge of said first bolster member with the forward lower edge of said second bolster member,

said cushion members and said bolster members all having substantially the same height, and

third hinge means interconnecting the upper rear edge of said second cushion member with the rear bottom edge of said first bolster member, and

said third hinge means including first and second mutually disconnectable flexible strips to permit separation of said bolster members from said cushion members.

4,173,046

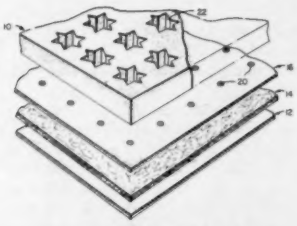
ABSORPTIVE PATIENT UNDERPAD

John P. Gallagher, 88 Ashley Ave., Charleston, S.C. 29401

Filed Aug. 10, 1977, Ser. No. 823,418

Int. Cl.[2] **E03C** *11/10;* **A61F** *13/00*

U.S. Cl. 5—484 **1 Claim**



1. A disposable patient underpad characterized by:

a first liquid impervious bottom layer;

a second coextensive liquid absorbing layer disposed on said bottom layer;

a third coextensive layer disposed on said liquid absorbing second layer, said third layer composed of a liquid impervious sheet having a plurality of spaced openings extending from face to face thereof; said spaced openings in said third layer being of the order of from about 1 to about 3 mm in cross dimensions and spaced not closer than about 1 cm apart to provide liquid drainage into said second layer and to retard generation of odors in fluids contained in said second layer; and a fourth coextensive hydrophobic closed cell expanded foam body cushioning layer secured to said third layer, said fourth layer having a plurality of openings extending from face to face thereof, wherein the openings in said fourth layer are on the order of from about 1 to about 1½ cm in cross dimensions and spaced not closer than about 1 cm and said openings in the fourth layer comprising at least about ¼th the total surface area of said fourth layer and said openings in the fourth layer being vertically aligned with the openings in the third layer, said first, second, third and fourth layers being joined into an integral underpad.

4,173,047

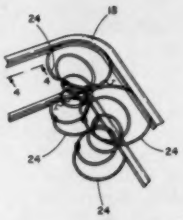
TUBULAR BORDER FRAME FOR INNER SPRING ASSEMBLIES

John W. Schaefer, Des Plaines, Ill., assignor to Nachman Corporation, Des Plaines, Ill.

Filed May 8, 1978, Ser. No. 904,040

Int. Cl.[2] **A47C** *23/04, 25/00*

U.S. Cl. 5—260 **15 Claims**



1. A border frame for attachment to coil inner spring assemblies comprising:

(a) a hollow elongated tubular member having open ends and of a length and configuration whereby one or more of said members will surround said inner spring assembly, said tubular member including means defining a longitudinally disposed opening into the interior of said member for receiving and securing therein a portion of selected ones of said inner spring assemblies at selected locations along said opening,

(b) means for connecting the open ends of said tubular members to form said border frame,

said receiving and securing means is a pair of opposed lips integral with said tubular member extending inwardly from the surface of said member to a point of engagement near the center of said member, said lips defining said opening therebetween and acting to receive and resiliently engage said spring assemblies.

4,173,048

PILLOW CONFIGURATION

John A. Varaney, 20 Overton Ave., Milford, Conn. 06497

Filed Feb. 1, 1978, Ser. No. 874,369

Int. Cl.[2] **A47C** *23/06*

U.S. Cl. 5—436 **9 Claims**

1. A pillow for comfortably encircling substantially the entire body of the user comprising:

A. a central portion for supporting the head of the user, and

B. two extension portions flexibly interconnected with said central portion, substantially perpendicular thereto, and extending substantially the entire length of the bed, providing arm rest zones and blanket retaining means,

whereby the pillow comfortably supports the user's head, allowing him to enter a major portion of the pillow and merge

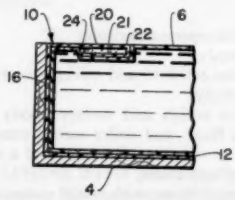
comfortably therewith with the pillow sides encircling the user's body.

4,173,049

FLOTATION LINER WATERBED STRUCTURE

Ronald G. Underwood, 1415 W. North St., Anaheim, Calif. 92801, and James C. Hauser, 26621 Westvale Rd., Palos Verdes, Calif. 90274

Filed Dec. 27, 1977, Ser. No. 864,466
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—451 **19 Claims**



1. A safety liner for retaining liquids in a confined volume comprising the combination: bottom and side wall panels forming an impervious liquid boundary interface, said side wall panels opposite said bottom wall terminating in outwardly, spaced buoyant portions adapted to maintain said side walls in a liquid encompassing and confining position, said buoyant portions being formed by spaced wall portions thereby defining an enclosed laterally extending, with respect to said bottom panel, hollow flotation chamber, the width and thickness of said buoyant portions being sufficient to provide buoyant forces for buoying up said side wall panels, said bottom, side wall panels and spaced wall portions being formed by heat-sealable plastic.

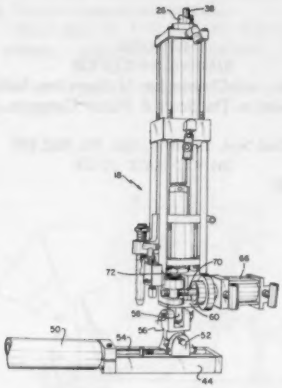
4,173,050

PINCERS ASSEMBLY AND ITS MOUNTING

Walter Vornberger, Tewksbury, Mass., assignor to International Shoe Machine Corporation, Nashua, N.H.

Filed Aug. 10, 1978, Ser. No. 932,596
Int. Cl.[2] A43D *23/00*
U.S. Cl. 12—14.5 **3 Claims**

1. In combination with a pincers assembly comprising: a base at its bottom; and an upwardly extending sleeve having a pincers mounted to its top; a mounting for causing forward-rearward movement of the pincers assembly characterized in comprising: a bearing, through which the sleeve extends, mounted for universal movement; a slide, located below the base, mounted for forward-rearward movement; powered means connected to the slide for effecting said forward-rearward movement; a universal joint mounted to the slide; and connecting means connecting the universal joint to the base.

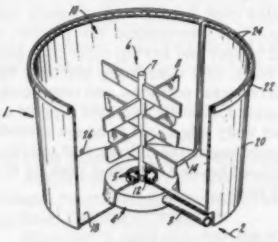


4,173,051

VEGETABLE WASHER

Joyce P. Reid, 1316 W. 115th St., Chicago, Ill. 60643

Filed Jun. 26, 1978, Ser. No. 919,074
Int. Cl.[2] A23N *13/00*
U.S. Cl. 15—3.12 **4 Claims**



1. An apparatus for washing and cleaning food articles including, in combination

(a) means for housing said food articles,
said housing means including,
a base region,
a wall region formed with said base region, and
a lid,
said lid being removably attachable to the upper portion of said wall region so as to permit the introduction and removal of said food articles to and from the apparatus when said lid is in a first, removed position, and to prevent the discharge of cleaning fluid and said food articles from the apparatus when said lid is in a second, attached position,

(b) means for agitating said food articles and a cleaning fluid within said housing means,
said agitation means including impeller means responsive to turbine means,

(c) means for introducing said cleaning fluid under pressure into said housing means to generate said turbine means,

(d) means for spraying said cleaning fluid discharged from said turbine means at said food articles being agitated and washed,
said spraying means permitting said cleaning fluid to be

directed at said food articles in a plurality of streams so as to further wash said food articles, and

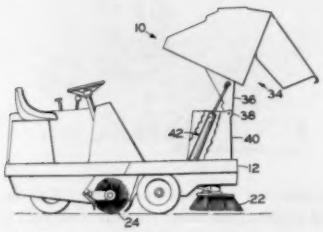
(e) means for discharging said cleaning fluid from said apparatus.

4,173,052

RIDING SWEEPER

Jack L. Burgoon, and Christopher M. Knowlton, both of Toledo, Ohio, assignors to The Scott & Fetzer Company, Lakewood, Ohio

Filed Nov. 17, 1977, Ser. No. 852,199
Int. Cl.[2] A47L *11/24*
U.S. Cl. 15—83 **6 Claims**



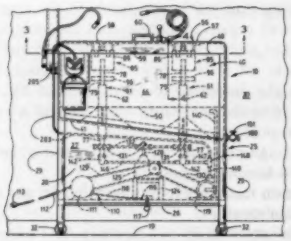
6. A sweeping machine comprising a body, a drum brush rotatably carried by said body in a transverse position, an upwardly-extending rigid support on a forward end portion of said body, a hopper located at a forward position above said drum brush and having forwardly-extending arms at an upper front portion thereof which are pivotally connected to an upper portion of said support, said hopper having an open top, a lid pivotally connected to said hopper at a rear edge of said top, fluid-operated rams having ends pivotally connected to said arms at portions intermediate the pivotal connections thereof and said hopper and having other ends pivotally connected to said body, said rams being enclosed by said rigid support when in retracted positions, said rams being positioned to pivot said hopper forwardly over said support and over the front end of said body when said rams are extended, said lid also swinging open under the influence of gravity when said hopper top is moved beyond a vertical position to a dumping position by said rams.

4,173,053

CLEANING APPARATUS

Robert N. Wills, 5018 E. Townsend, Fresno, Calif. 93727

Continuation-in-part of Ser. No. 757,203, Jan. 6, 1977, Pat. No. 4,115,891. This application Aug. 28, 1978, Ser. No. 937,464
Int. Cl.[2] A46B *13/04*
U.S. Cl. 15—71 **10 Claims**



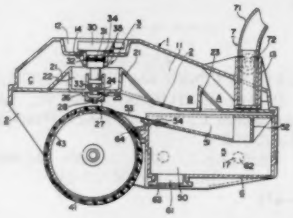
1. An apparatus for cleaning containers bearing paint or the like, the apparatus comprising a housing; a cleaning assembly mounted within the housing; grasping means, having predetermined grasping and releasing modes, borne by the apparatus for holding, in said grasping mode, a container to be cleaned in position for cleaning by said cleaning assembly; a pressure system operably connected to the grasping means; control means for operating the pressure system selectively to dispose the grasping means in said grasping and releasing modes; means for driving the cleaning assembly; and means for pumping a solvent to the cleaning assembly during operation of the apparatus and exhaust means mounted on the housing in communication with the interior thereof for removing gases therefrom.

4,173,054

FLOOR SWEEPER

Masumi Ando, Kashiwa, Japan, assignor to Hukuba Kogyo Kabushiki Kaisha, Chiba, Japan

Filed Jan. 27, 1978, Ser. No. 873,058
Claims priority, application Japan, Aug. 11, 1977, 52/96293; Aug. 11, 1977, 52/107377[U]
Int. Cl.[2] A47L *11/282*
U.S. Cl. 15—98 **3 Claims**



1. A floor sweeper comprising:

a sweeper body;

a handle connected to said sweeper body for moving said sweeper body;

roller means within said sweeper body for washing and wiping a floor, said roller means comprised of a roller rotatably mounted in said body and a washer belt on the outside of said roller;

a liquid compartment within said sweeper body above said roller means, said liquid compartment being adapted to hold liquid therein and supply said liquid to said washer belt therebeneath;

stopper means within said sweeper body adjacent said roller means for preventing said roller means from rotating when said sweeper body is moved forward and for allowing said roller means to rotate when said said sweeper body is moved rearward;

scraper means contacting said washer belt for squeezing liquid from said washer belt when said roller means is rotated; and

waste fluid container means adjacent said scraper means for collecting fluid squeezed from said washer belt by said scraper means.

4,173,055

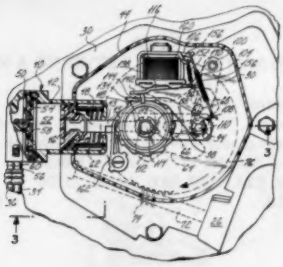
WINDSHIELD WASHER PUMP DRIVE MECHANISM

John Izumi, Glen Ellyn, and Angelo D'Orio, Elmwood Park, both of Ill., assignors to Auto Components, Inc., Franklin Park, Ill.

Filed Nov. 13, 1978, Ser. No. 960,447
Int. Cl.[2] B60S *1/46*
U.S. Cl. 15—250.02 **36 Claims**

1. A windshield washer pump drive mechanism for use in conjunction with a windshield wiper drive motor of the type having a drive pin adapted to revolve in a circular path when the motor is actuated, and movable to a prescribed point along said circular path and then in a generally radial direction, outwardly thereof, to a park position as said motor is deactu-

ated, said mechanism comprising a pump, a reciprocatable rod for driving said pump, movable cam means, means operably connected to said rod and said cam, to reciprocate said rod between intake and discharge positions, respectively, in accordance with the movement of said cam, and means for automatically causing engagement between said cam and said drive pin after installation of said mechanism adjacent said motor, said engaging means comprising: first means situated on said cam



and adapted to engage said pin only during the movement of said pin along said circular path prior to the first movement of said pin to said park position after installation; second means situated on said cam and adapted to engage said pin at all times after said pin is disengaged from said first means by said first movement of said pin to the park position; and, means for positioning said cam to bring said second means into engagement with said pin subsequent to said first movement of said pin to said park position.

4,173,056

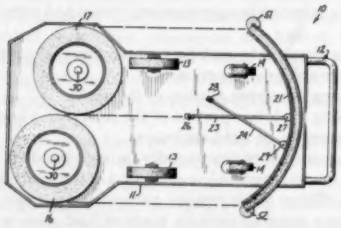
SCRUBBING MACHINE WITH TRACKING SQUEEGEE

Robert A. Geyer, Anoka, Minn., assignor to Tennant Company, Minneapolis, Minn.

Filed Jun. 26, 1978, Ser. No. 918,771

Int. Cl.[2] A47L *11/283, 11/293, 11/30*

U.S. Cl. 15—320 **9 Claims**



1. A scrubbing machine including a body structure, a plurality of wheels supporting said body, means for depositing scrubbing solution on a surface to be scrubbed thereby providing a wetted path and scrubbing brush means for working said solution on said surface, and vacuum squeegee means for picking up said solution from said surface said squeegee means being disposed rearwardly of said wheels, said squeegee means including draw bar means for pulling said squeegee means along said wetted path and steering bar means for tracking said squeegee means along the wetted path both while traveling along a straight line and when traveling along an arcuate path.

4,173,057

APPARATUS FOR RECEIVING AND GATHERING A FIBRE BAND FROM A CARD OR STRETCHER

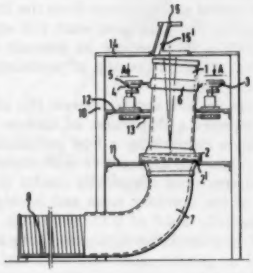
Louis Vignon, Geneva, Switzerland, assignor to Heberlein Hispano SA, Vernier-Geneve, Switzerland

Filed Jun. 30, 1978, Ser. No. 920,822

Claims priority, application Switzerland, Jul. 12, 1977, 5869/77

Int. Cl.[2] B65H *54/80*

U.S. Cl. 19—159 R **5 Claims**



1. Apparatus for receiving and gathering a fibre band comprising means for supporting a lower end of a cylindrical tube, a cylindrical tube mounted on said supporting means and extending upwards therefrom with the longitudinal axis of said cylindrical tube at an inclination to an imaginary fixed vertical line passing through the centre of said lower end of said tube, a ball bearing assembly embracing said tube at a location there around closer to the upper end of said tube than to said lower end, said assembly including an outer race encircling said tube with a centre point on said axis, and crank mechanism operative on said race to displace said centre point with a circular movement thereby causing said longitudinal axis of said tube to trace out the surface of a cone having its apex at said lower end of said tube.

4,173,058

METHODS FOR MANUFACTURING PHOTOGRAPHIC FILM PROCESSING ROLLERS

Frank M. Stieger, Newton Highlands, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1977, Ser. No. 838,557

Int. Cl.[2] B21H *1/14*

U.S. Cl. 29—148.4 D **7 Claims**

7. A method for manufacturing photographic film processing rollers each having a given length comprising the steps of:

cutting a cylindrical stainless steel rod having a length greater than a plurality of said given length of said processing rollers into a plurality of segments each having a length at least equal to said given length of said processing rollers;

machining each rod segment to provide its opposite ends with journals having maximum diameters less than the diameter of the rod to facilitate mounting the rod for rotation in a film processing apparatus, the journals each having a predetermined length so that the distance between the journals generally defines the width of a film-contacting surface;

connecting the rod segments together end to end by inserting their journals into couplings to form a continuous chain of rod segments;

applying an adhesive composition to the surface of each rod segment to promote bonding between the stainless steel surface of each rod segment and a polymer;

pushing the continuous chain of rod segments through a cross-head extrusion die to deposit a melted polymer comprising an elastomeric urethane resin on the adhesive composition covering the surface of each rod segment to provide the segment's surface with a thin polymeric coating whose coefficient of friction is greater than that of the stainless steel;

subjecting the coated rod segments to a predetermined temperature to harden the polymeric coating;

separating the coated rod segments from the couplings; and

centerless grinding the coating of each rod segment to reduce its thickness intermediate its journals to provide a film-contacting traction coating of predetermined thickness and smoothness,

the method steps recited above wherein the adhesive composition comprises a dispersion of carbon black in an adhesive matrix comprising a first polymeric resin containing functional groups reactive with stainless steel and a second polymer resin chemically similar to a polymeric constituent of the urethane resin and having a thickness when substantially dried of 0.15 ± 0.05 mils, wherein the thickness of the extruded polymeric coating is no less than 9.0 mils and no greater than 10.0 mils, and wherein the thickness of the centerless ground film-contacting traction coating is no less than 5.0 mils and no greater than 7.0 mils.

4,173,059

DEVICE FOR TIGHTENING BOLTS

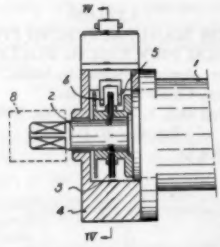
Hiroshi Hashimoto, and Kinya Mori, both of Nishikasugai, Japan, assignors to Sanyo Machine Works, Ltd., Aichi, Japan

Division of Ser. No. 642,706, Dec. 22, 1975, Pat. No. 4,095,325. This application Apr. 11, 1978, Ser. No. 895,398

Claims priority, application Japan, Dec. 24, 1974, 50/3163; Oct. 13, 1975, 50/123449; Oct. 13, 1975, 50/123450; Oct. 13, 1975, 50/123451; Oct. 14, 1975, 50/124025; Oct. 14, 1975, 50/124026

Int. Cl.[2] B23P *19/04*; B25B *23/147*

U.S. Cl. 29—240 **4 Claims**



1. Apparatus for tightening a bolt to a member to be clamped by the rotative angle method comprising electric motor means, said motor means so constructed that the current generated thereby is proportional to the torque of said motor means, shaft means connected at one end to said motor means for rotation thereby and the opposite end adapted to receive bolt engaging means, speed change means operatively positioned to said motor for switching the rotative speed of said shaft means from high to low speed at a predetermined point of time during the tightening of a bolt, torque detector means operatively associated with said motor for detecting the current generated by the said motor and thereby determining the torque exerted on the shaft means of said motor means, and rotative angle detector means for rotating the bolt to be tightened through a fixed angle from a predetermined point of time and then stopping the rotation of the shaft means of said motor means whereby, upon detection of the predetermined torque by said torque detector means, the speed change means will be actuated along with said rotative angle detector means to change the speed of rotation of said shaft means from high to low and then to a stop position upon the completion of the tightening of the bolt.

4,173,060

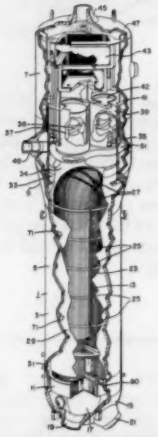
SYSTEM AND METHOD FOR RETUBING A STEAM GENERATOR

Anthony A. Massaro, Jr., Monroeville, and Harry N. Andrews, Franklin Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 24, 1977, Ser. No. 809,588

Int. Cl.[2] B23P *7/00, 17/00, 15/26*

U.S. Cl. 29—157.4 **19 Claims**



11. A method for retubing a steam generator having a shell with enlarged upper portion, a tube sheet with a channel head, a plurality of U-shaped tubes which extend upwardly from the tube sheet to form a tube bundle and a wrapper encircling the tube bundle, the method being applicable to a steam generator vertically oriented in a containment vessel and comprising the steps of:

parting the shell by making a circumferential cut to form an upper and lower portion;

removing the upper portion of the shell;

enclosing the lower portion of the shell with a hood to form a generally air tight enclosure;

forcing air to flow downwardly through the shell by removing the air from the lower portion of the shell and filtering the effluent air to remove particulate materials;

placing a gondola partially made of lead glass in the shell; and

utilizing the gondola as a work station for directly observing and cutting the tubes in segments starting from the top of the tube bundle for removing the tubes from the steam generator;

installing a generally rigid tube support structure in the shell;

sliding tubes through the support structure and into holes in the tube sheet;

welding the tubes to the tube sheet; and

expanding the tubes into engagement with the tube sheet throughout the portion where they are contiguous; and

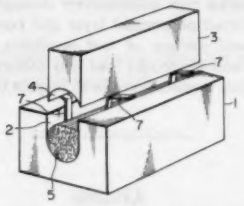
replacing the upper portion of the shell.

4,173,061

PROCESS FOR FORMING A BILLET FOR EXTRUSION

Kazushige Shimizu, Hoya, and Takuma Maeda, Ube, both of Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 671,033, Mar. 29, 1976, abandoned.
This application May 1, 1978, Ser. No. 901,465
Claims priority, application Japan, Apr. 3, 1975, 50-39775; Sep. 30, 1975, 50-117225
Int. Cl.[2] B21C *23/04;* B23P *7/00*
U.S. Cl. 29—403.2 4 Claims



1. A process for forming extruded goods which are substantially free from surface defects, from scrap bars of extruded goods, said scrap bars having an irregular cross-section and being selected from the group consisting of aluminum and its alloys, comprising the steps of:

cutting said scraps into bars having a predetermined length;

piling up a number of said scrap bars in a recess of a female die part which recess is grooved in one direction of said female die part, by first arranging metallic bands or wires along the wall of said recess and in a direction perpendicularly crossing the longitudinal axes of said cut scrap bars to be piled, said metallic bands or wires having a length greater than the peripheral length of said cut scrap bars to be piled, then piling said cut scrap bars by laying same on said bands or wires in a manner such that the longitudinal axes of said cut scrap bars are in agreement with the longitudinal axes of said recess, and said cut scrap bars are parallel to each other, clearances are formed therebetween, and the ends thereof are even, and then fastening and tying said bands or wires around said piled cut scrap bars, thereby forming a scrap aggregate having a predetermined length;

exerting an external force on said scrap aggregate in directions perpendicular to the longitudinal axes of said scrap bars by advancing a male die part into said recess of said female die part thereby forming a billet based upon the density of the metal of said scrap in the range between 70 and 90 percent, said billet containing clearances running through said billet in the longitudinal direction and terminating at the ends of said billet;

preheating said billet;

loading said preheated billet in a container of an extrusion press machine provided with a device for degassing the air in said billet;

degassing the air contained in said clearances through the terminating ends of said clearances, while said billet is contained in said container; and

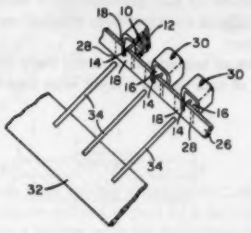
extruding said degassed billet, whereby said extrusion is substantially free from surface defects.

4,173,062

METHOD OF FORMING A QUADRIPLANAR COMPONENT

Gerald M. Locke, Saco, Me., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 714,297, Aug. 16, 1976, Pat. No. 4,097,915.
This application Dec. 7, 1977, Ser. No. 858,111
Int. Cl.[2] H01G *9/24*
U.S. Cl. 29—570 7 Claims



1. A method of forming a quadriplanar component comprising the steps of

forming a unitary electrically conductive capacitor enclosure open at one end, the opening defining edge portion of said enclosure forming a quadrilateral, said quadilateral being in one plane said enclosure forming one electrode of said quadriplanar component,

providing a component element with a lead fixedly attached to said element,

disposing said component element within said enclosure in electrical relationship therewith with said lead extending outwardly from said open end substantially perpendicularly to the plane of said quadrilateral,

providing an elongated metallic strip having a plurality of apertures and a plurality of breakaway notches formed therein, each said aperture being intermediate two of said notches, the portions of said strip between said breakaway notches substantially corresponding to the size and shape of said quadrilateral, said apertures being suitable for accommodating said lead,

disposing the outwardly extending end of said lead in one of said apertures, and

fixedly attaching said strip to said lead for electrical continuity therebetween, the plane of said strip being substantially parallel to the plane of said quadrilateral and substantially perpendicular to the longitudinal axis of said lead, said lead and said portion of said strip between said notches forming the other electrode of said quadriplanar component.

4,173,063

FABRICATION OF A SEMICONDUCTOR COMPONENT ELEMENT HAVING A SCHOTTKY CONTACT AND LITTLE SERIES RESISTANCE UTILIZING SPECIAL MASKING IN COMBINATION WITH ION IMPLANTATION

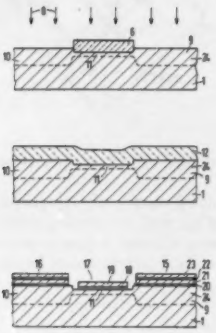
Hermann Kniepkamp, and Walter Kellner, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 30, 1977, Ser. No. 811,875
Claims priority, application Fed. Rep. of Germany, Jul. 15, 1976, 2631873
Int. Cl.[2] H01L *21/265, 29/48, 29/80*
U.S. Cl. 29—571 11 Claims

1. Process for the production of a semiconductor component element with a Schottky contact, in which a layer bordering on the surface of a high-ohmic semiconductor body is doped by means of ion implantation, which includes the following steps:

(a) application of a layer of photosensitive lacquer onto a surface of a high ohmic semiconductor body;

(b) exposure and development of said photosensitive lacquer so that an area of said semiconductor body intended for the Schottky contact is freed from said photosensitive lacquer;
(c) etching a depression in said semiconductor body at said points freed from said photosensitive lacquer;
(d) application of a masking layer on said photosensitive lacquer layer and on the areas of said semiconductor body free of said photosensitive lacquer;
(e) development of said photosensitive lacquer and removing parts of said masking layer situated on said photosensitive lacquer;
(f) irradiation of said semiconductor body which has a residual layer of said masking layer with ions having a doping



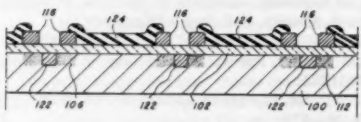
effect, in which connection the thickness of said residual layer and the kinetic energy of said ions are selected in such a way that the area of said semiconductor body lying under said residual layer is doped 10 to 100 times weaker than the areas bordering thereon;
(g) etching away of said residual layer;
(h) application of a covering layer onto said semiconductor body;
(i) tempering said semiconductor body provided with said covering layer;
(j) etching away said covering layer;
(k) application of source and of drain contacts on said semiconductor body with the aid of a removal technique; and
(l) application of a Schottky contact on said semiconductor body in the area of said depression.

4,173,064

SPLIT GATE ELECTRODE, SELF-ALIGNED ANTIBLOOMING STRUCTURE AND METHOD OF MAKING SAME

Stephen A. Farnow, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 22, 1977, Ser. No. 826,279
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—578 **2 Claims**



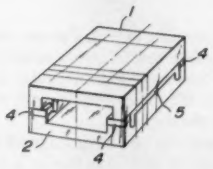
1. A method of fabricating an antiblooming drain structure in a charge-coupled device imager comprising:
forming a pair of spaced apart electrodes on an insulating layer disposed on a semiconductor substrate of a first type conductivity;
providing a layer of photoresist material covering said electrodes and the insulating layer on said substrate;
patterning said photoresist layer to provide an aperture therethrough in alignment with the space between said pair of electrodes and exposing the portion of said insulating layer extending between said electrodes, wherein said electrodes serve as a first mask defining the exposed portion of said insulating layer extending therebetween and said patterned photoresist layer serves as a second mask covering the portion of the insulating layer on opposite sides of said electrodes; and
forming a drain region of a second type conductivity opposite to that of said substrate by directing a dopant impurity of the second type conductivity through the aperture in said patterned photoresist layer and penetrating through the exposed portion of said insulating layer extending between said electrodes into said substrate such that the drain region is self-aligned with respect to said electrodes.

4,173,065

METHOD OF MANUFACTURING A MAGNETIC HEAD

Naotsune Tsuda, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 14, 1978, Ser. No. 886,336
Int. Cl.[2] G11B *5/42*
U.S. Cl. 29—603 **4 Claims**



1. A method of manufacturing a magnetic head comprising steps of providing a pair of core blocks arranged facing each other and each having a gap forming surface and gap holding surfaces formed on each core block, providing spacers between the gap holding surfaces of the core blocks, setting the thickness of the spacers and the space between the gap holding surfaces to make an optical gap between the gap forming surfaces, and melting and permeating a gap forming material into the optical gap in such a manner that the melted gap forming material is slightly permeated into the core blocks along the gap forming surfaces, the gap holding surfaces being formed relative to the gap forming surfaces to provide a wider spacing between the gap holding surfaces thereby to enable utilization of spacers thicker than the spacing formed between the gap forming surfaces.

4,173,066

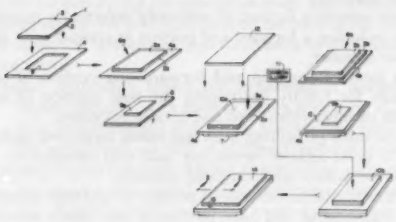
METHODS FOR MAKING LAMINAR CELLS

Gordon F. Kinsman, Billerica, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 811,470, Jun. 30, 1977, Pat. No. 4,125,686.
This application Dec. 8, 1977, Ser. No. 858,684
Int. Cl.[2] H01M *4/04*
U.S. Cl. 29—623.1 **6 Claims**

1. In the method of making a laminar electrical cell using an electrode layer prelaminated to a separator sheet, the steps of covering said electrode layer with an aqueous slurry dispersion

of carbon black, and contacting said carbon dispersion with a sheet of conductive plastic to establish electronic communica-



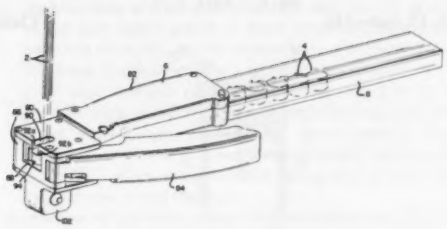
tion between said conductive plastic sheet and said electrode layer through said carbon dispersion.

4,173,067

APPLICATOR APPARATUS FOR USE WITH ROTARY CONNECTOR

Charles D. Steiner, and Matthew M. Sucheski, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 10, 1977, Ser. No. 850,171
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—749 **8 Claims**



1. Apparatus for splicing a plurality of wires in a two-part rotary actuated electrical connector, said apparatus comprising:

(a) a connector termination station comprising means for sequentially receiving a plurality of connectors in tandem configuration, said connector terminating station being open on first and second opposite ends,

(b) connector feeding means for advancing said connectors sequentially into said connector terminating station from said first end,

(c) connector stop means for abutting the first part of a connector and positioning the connector in the connector terminating station, said connector stop means being adjacent to said second end,

(d) alignment means in the connector terminating station for guiding connectors through the connector station terminating station and for preventing rotation of the second part of a connector in the connector terminating station, said alignment means extending from said first to said second end of the connector terminating station, and

(e) connector terminating means for imparting a force to the first part of a connector in the connector terminating station to cause relative rotation between the first and second parts of a connector, whereby

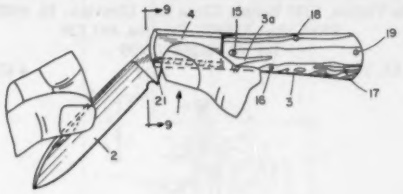
wires are positioned in a connector located in the connector terminating station and electrically interconnected upon relative rotation between the first and second connector parts.

4,173,068

BOLSTER-ACTUATED LOCKBACK KNIFE

Bobby L. Cargill, 14401 136th Ave., Lockport, Ill. 60441

Filed May 22, 1978, Ser. No. 907,947
Int. Cl.[2] B26B *1/04*
U.S. Cl. 30—161 **5 Claims**



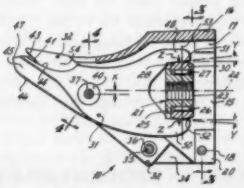
1. In a lockback knife having a handle formed with a knife blade receiving recess defined in part by a pair of spaced handle sides including a bolster with the knife blade being pivoted between the sides adjacent a first end of the handle at which the bolster is disposed, the improvement comprising an elongated metallic main spring disposed between the sides to form at least a part of a bottom for the blade receiving recess and with the spring being restrained generally on the end of the handle opposite the first end, first locking means being formed on the main spring opposite the restrained end and second locking means being formed on the pivoted end of the knife blade with the two locking means engaging one another to lock the knife open, and the bolster being fixed to the free end of the main spring opposite the restrained end and the bolster when manually operated pivoting the main spring about its handle restraint to disengage the two locking means to enable the knife blade to be returned to a closed position within the recess.

4,173,069

POWER SHEAR HEAD

Harry L. Sidenstick, and Henry R. Hoffman, both of Cincinnati, Ohio, assignors to Kett Tool Co., Cincinnati, Ohio 45227

Filed May 24, 1978, Ser. No. 908,816
Int. Cl.[2] B26B *15/00*
U.S. Cl. 30—228 **4 Claims**



1. A portable power shears for cutting sheet metal, said shears being powered by a motor unit and comprising:

a housing surrounding the drive shaft of said motor unit;

two stationary shear blades carried by said housing in spaced relationship to one another;

a movable shear blade disposed between said stationary blades;

a pivot pin supporting said movable shear blade upon said housing, said pivot pin being spaced from the axis of said drive shaft on the side of said axis remote from said stationary blades;

an eccentric bushing mounted upon said drive shaft;

a ring rotatably mounted upon said bushing, said ring having an arcuate peripheral surface;

said movable blade having two spaced arms, each of said arms having a shoulder in engagement with said ring, said

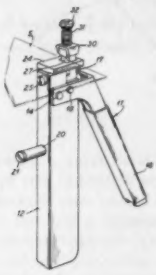
shoulders diverging outwardly from the axis of said drive shaft, said arms engaging said ring on portions of said ring disposed toward said pivot pin from the transverse center line of said ring.

4,173,070

CUTTING TOOL FOR METALS AND PLASTICS

James Vistain, 1320 Bonnie Glenn La., Glenview, Ill. 60025

Filed Mar. 3, 1978, Ser. No. 883,126
Int. Cl.[2] B26B *15/00*
U.S. Cl. 30—241 **4 Claims**



1. A hand tool for shearing individual chips from a relatively stiff sheet material which comprises:

a pair of hollow handle members,

a relatively stationary pivot means interconnecting said handle members to permit relative pivotal movement therebetween,

a cutter support means secured to one of said handle members,

a cutter element reciprocable within said cutter support means,

said cutter element having a cutting edge having a relatively small radius formed thereon,

means interconnecting said cutter element with the handle members to cause downward movement of said cutter element upon movement of said pair of handle members toward each other,

said cutter support means including an aperture over which the sheet material to be sheared is received, the size of the aperture being greater than the chip severed from said sheet by said cutter element by virtue of said radius preventing said sheet from bridging said aperture, and

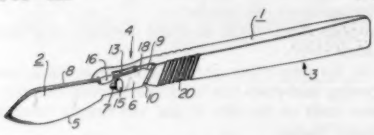
discharge means communicating with the hollow interior of the handle member to discharge chips sheared by said cutter means and falling through said aperture.

4,173,071

KNIFE HAVING AN EXCHANGEABLE BLADE

Minoru Ishida, Gifu, Japan, assignor to Feather Safety Razor Co., Ltd., Osaka, Japan

Filed Feb. 1, 1978, Ser. No. 874,174
Claims priority, application Japan, Feb. 2, 1977, 52/10574[U]
Int. Cl.[2] B26B *1/00*
U.S. Cl. 30—339 **9 Claims**



1. A detachable knife assembly comprising:

a blade member including a cutting head portion integrally attached to a base portion, said base portion including an elongated aperture extending completely therethrough; and

a profiled end portion positioned remote from said cutting head portion;

a handle assembly formed of resiliently deformable material and including a forward end portion in contact with said blade member;

recess means formed in said forward end portion of said handle for fixedly positioning the base portion of said blade member relative to said handle assembly;

a stud member projecting from said recess means and including a cross-section permitting said stud member to be received within said elongated aperture;

latch means attached to an end portion of said stud member for maintaining said base portion of said blade member within said recess means;

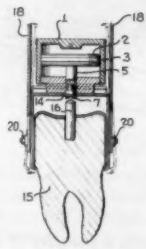
stop means attached to said forward end portion and positioned on a first side of said stud member for overlapping and securing the base portion of said blade member within said recess means; and guide ridge means positioned on an opposite side of said stud from said stop means and cooperating with said stop means for permitting said resiliently deformable handle to flex a greater amount than the base portion of said blade member during attachment of said blade member to said forward end portion of said handle.

4,173,072

DENTAL CROWN REMOVER

John C. Gager, Alexandria, Va., assignor to Terry W. Gager; Terry W. Gager and Francine Oster, all of Alexandria, Va.

Filed Mar. 15, 1977, Ser. No. 777,713
Int. Cl.[2] A61C *3/16*
U.S. Cl. 433—120 **3 Claims**



1. A dental crown or bridgework remover comprising crown or bridgework gripping means having attached thereto a power actuated ram including drive means arranged to drive in the direction of the biting surface of the associated crown or bridgework in a direction generally normal thereto so as to separate said crown or bridgework from its underlying tooth system.

4,173,073

TRACK DISPLACEMENT DETECTING AND MEASURING SYSTEM

Yoshiro Fukazawa; Takahiko Mochinaga, both of Tokyo; Morimasa Shirozume, Chigasaki; Satoru Kishimoto, Higashikurume; Makoto Ito, Hadano, and Fukuo Iwaya, Tokyo, all of Japan, assignors to Hitachi, Ltd.; Japanese National Railways and Hitachi Electronics Engineering Co. Ltd., all of, Japan

Filed Nov. 18, 1977, Ser. No. 852,974
Claims priority, application Japan, May 25, 1977, 52-59780; May 25, 1977, 52-59781; May 25, 1977, 52-59782
Int. Cl.[2] E01B *27/17, 33/00, 35/02*; E61K *9/08*
U.S. Cl. 33—1 Q **5 Claims**

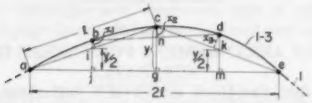
1. In a track displacement detecting and measuring system including three sensors mounted at the front, middle and rear

parts of a track inspection car, respectively, said sensors mounted at the front and rear parts of the track inspection car being spaced apart from each other by a unit chord length, and means for computing the amount of track displacements in the horizontal and vertical directions on the basis of the amounts of rail deviation detected by said three sensors, the improvement comprising:

signal generating means for generating a distance pulse signal consisting of a train of pulses appearing at intervals of a predetermined distance in interlocking relation with the rotation of a wheel of the track inspection car;

analog-digital converter means connected to said computing means and said signal generating means for converting into digital data the amount of track displacement derived from said computing means, which digital data is provided at the output of said converter means in synchronism with the pulses of said distance pulse signal;

a shift register connected to said converter means and consisting of a plurality of stages capable of sequentially storing said digital data provided by said converter means;



an arithmetic circuit connected to said shift register for reading out, from among the data stored in said shift register, data of track displacements obtained for an individual unit chord length at three predetermined spaced points on the track, and for computing a projected amount of a track displacement for a multiple chord length which is an even multiple of said unit chord length from the read-out data of the three track displacements, the positional interrelation among said predetermined three spaced points for said multiple chord length corresponding to the positional interrelation among said three sensors for said unit chord length;

digital-analog converter means for converting the output of said arithmetic circuit into analog data; and

recording means for recording said analog track displacement data applied from said digital-analog converter means together with said analog track displacement data derived from said computing means.

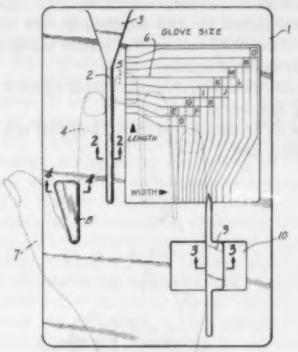
4,173,074

HAND MEASURING DEVICE

Howard F. Newman, Los Angeles, and Benjamin Stansbury, Beverly Hills, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Oct. 31, 1977, Ser. No. 846,924
Int. Cl.[2] A41H *1/02*
U.S. Cl. 33—2 R **4 Claims**

1. A hand measuring device for use in selecting a surgeon's glove comprising: a supporting base; a lateral stop fixed to the base and having an upstanding portion against which is placed one edge of a hand's palm; and upstanding gauge member connected to the base, said gauge member being laterally movable relative to said lateral stop for contacting an opposite edge of such palm to measure its width; a thin upstanding crotch stop laterally spaced from the lateral stop for positioning between two fingers; said crotch stop being fixed against longitudinal movement relative to the base, but having a finger crotch engaging portion that is laterally movable so as to accept different finger thicknesses between the lateral and crotch stops; means for measuring finger length; and indicator



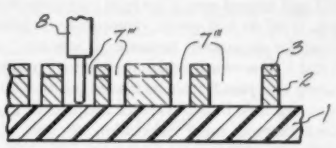
means on the device for correlating the palm width and finger length into a proper glove size reading.

4,173,075

ENGRAVER'S TEMPLATE

John V. Stewart, Watchung, N.J., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 748,428, Dec. 8, 1976, Pat. No. 4,139,386.
This application Jan. 16, 1978, Ser. No. 869,664
Int. Cl.[2] B43L *13/00*
U.S. Cl. 33—23 K **8 Claims**



1. An engravers template having a desired pattern therein with engraved portions and raised portions comprising a metal sheet having a thickness from about 0.005 to 0.20" and having an oxide layer on one side having a thickness from about 0.0004 to 0.001" and a plastic layer on the opposite side adhered thereto having a thickness from about 0.01 to 1.0", wherein the desired engraved pattern is etched through the oxide layer and through the metal sheet to provide an integral plastic-metal engravers template having said desired pattern etched into the metal sheet and supported by said adhered plastic layer.

4,173,076

SCRIBER-COMPASS WITH SPRING-LOADED CENTER PUNCH

Thomas M. Gossage, 39 Seaview, Daly City, Calif. 94015

Filed Apr. 27, 1977, Ser. No. 791,388
Int. Cl.[2] B43L *9/22;* **B25D** *5/02*
U.S. Cl. 33—27 B **6 Claims**

1. A scriber-compass comprising

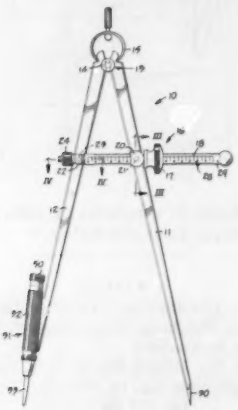
a pair of first and second arms pivotally connected together at first ends thereof, said arms being at least substantially straight and disposed in the same plane,

adjustment means interconnected between the first and second ends of said first and second arms for selectively pivoting said arms relative to each other to set the linear distance between the second ends of said arms comprising a threaded adjustment rod having a first thumb nut thread-

ably mounted thereon and means for axially adjusting said rod relative to said second arm including a second thumb nut threadably mounted on an end of said rod and rotatably mounted in a collar, restraining axial movement of said second thumb nut and attached to said second arm, whereby rotation of said second thumb nut in said collar will adjust said rod axially,

calibrated scale means on said adjustment means for visually indicating said linear distance,

a scribing point on the second end of said first arm and lying in said plane, and



punch means comprising a housing secured on the second end of said second arm to form an extension thereof and a punch, lying in said plane, reciprocally mounted in said housing for movement between an upward loaded position and a downward released position for automatically releasing said punch from its loaded position for punching a centering hole in a workpiece adapted to have a circle scribed thereon upon depression of said second arm against said workpiece.

4,173,077

PROCESS AND ADDITIONAL DEVICES OF DRYING MACHINES FOR THE UNIFORM DRYING OF TEXTILES

Walter Birke; Hans-Ulrich von der Eltz, and Franz Schön, all of Frankfurt am Main, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

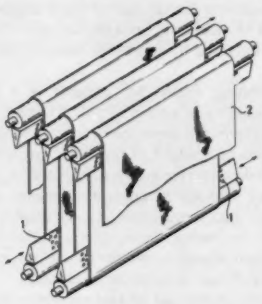
Filed Sep. 10, 1976, Ser. No. 722,156

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1975, 2540852

Int. Cl.[2] F26B *3/04*

U.S. Cl. 34—23 **3 Claims**

1. In a process for the uniform drying of a travelling moist textile material in the form of a structured fiber web impregnated with a fluid treating agent, containing a solid material that remains permanently in the web after drying, said process being of the type in which either one or both sides of the web are exposed to a heat source selected from a stream of hot air and radiant heat as the web passes over a bank of rotating rolls, the improvement which comprises applying the heat from said heat source to the moving web in a transversely oscillatory



manner to improve the uniformity of drying across the width of the web.

4,173,078

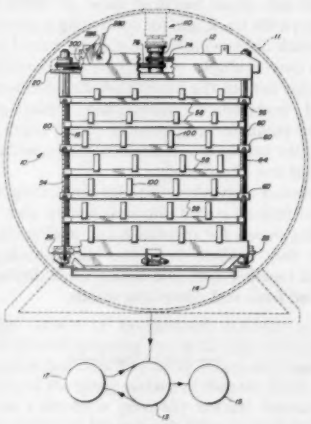
SHELF ARRANGEMENT FOR FREEZE DRYING APPARATUS

Harry L. Bird, Red Hook, and David T. Sutherland, Woodstock, both of N.Y., assignors to The Virtis Company, Inc., Gardiner, N.Y.

Filed May 16, 1978, Ser. No. 906,679

Int. Cl.[2] F26B *13/30*

U.S. Cl. 34—92 **19 Claims**



1. In a freeze dryer of the type including a sealable vacuum-tight drying chamber, a refrigerated condenser for condensing and freezing moisture removed from items being dried in the drying chamber, a vacuum pump connected to the drying chamber for evacuating the air from the drying chamber, and a cooling system for cooling the condenser; an improved shelf arrangement for use in the drying chamber comprising:

a rigid frame assembly having an upper bracket, a lower bracket, and spacing members holding said upper bracket and said lower bracket in a special apart relationship;

a multiplicity of elongated wire members stretched in a vertical relationship between said upper bracket and said lower bracket;

stop means mounted in predetermined positions along respective ones of said wire members;

a multiplicity of shelf means for supporting items to be dried in the drying chamber;

flange means mounted on said shelf means in suitable posi-

tions to slidably engage respective ones of said wire members and rest against respective ones of said stop means so that corresponding ones of said shelf means are supported by respective ones of said stop means in predetermined positions between said upper bracket and said lower bracket;

elevating means mounted on said frame assembly, said elevating means operably connected to the lowest shelf means of said multiplicity of shelf means to cause said lowest shelf means to move vertically;

drive means for driving said elevating means, said drive means mounted externally of the drying chamber and operably extending through a wall of the drying chamber to engage and drive the elevating means so that upon operation of said drive means in a foreward direction, said lowest shelf means is caused to move vertically upward engaging higher shelf means causing all of said shelf means to be slidably moved along said wire members until restrained by said upper bracket, and upon operation of said drive means in a reverse direction, said lowest shelf means is caused to move vertically downward to its original position, and each higher shelf means descends along said wire members until respective ones of said flange means engage corresponding ones of said stop means.

4,173,079

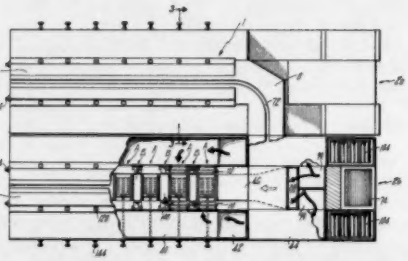
METHOD AND APPARATUS FOR DRYING INVESTMENT CASTING MOLDS

Carlton E. Cruff, Manchester, Conn., and William E. Harrison, Royal Oak, Mich., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 713,025, Aug. 9, 1976, Pat. No. 4,114,285. This application Jun. 26, 1978, Ser. No. 919,184

Int. Cl.[2] F26B *21/06*

U.S. Cl. 34—217 **14 Claims**



1. In the formation of investment casting molds, an apparatus for drying a layer of ceramic slurry on patterns of the article to be cast, comprising:

(a) an open-ended tunnel having a first and second series of individual drying stations therein for directing drying air of controlled quality, including controlled wet bulb temperature, dry bulb temperature and velocity, across the patterns, the quality of the drying air directed across the patterns at the first series of drying stations being adapted to the rapid moisture removal kinetics of the slurry layer and the quality of the drying air directed across the patterns at the second series of drying stations being adapted to the reduced moisture removal kinetics of the slurry layer so as to prevent harmful increases in pattern temperature during drying, each series of drying stations having associated therewith a series of individual exhaust stations for removing the drying air after it passes over the patterns;

(b) conveyor means extending the length of the tunnel for transporting the patterns into the tunnel, from one drying station to another in the first series and second series and out of the tunnel, including means for removably suspending the patterns from the conveyor means;

(c) air conditioning means for providing drying air to each series of drying stations, including means for maintaining the wet bulb temperature and dry bulb temperature of the air supplied to each series at predetermined values and means for imparting initial controlled velocity thereto;

(d) supply conduit means extending from said air conditioning means to the tunnel for carrying drying air to each series of drying stations, the supply means including at least one supply header associated with each series for distributing drying air to the individual drying stations thereof, and return conduit means extending from the tunnel to said air conditioning means, including at least one return header associated with each series of exhaust stations for collecting moisture-laden drying air from the individual exhaust stations thereof, the return conduit means thereafter recirculating said moisture-laden air from each return header to said air conditioning means;

(e) wherein the individual drying stations of each series comprise at least one conduit having an inlet end opening into the supply header and an outlet end opening into the tunnel, the conduit being disposed inside the tunnel transverse to the direction of advancement of the patterns therein such that the drying air flows through the conduit, out of the outlet end and across the patterns as they progress through the tunnel, means for effecting final velocity control of said air being disposed in the inlet end of the conduit and means for concentrating flow of said air on those portions of the patterns which are most difficult to dry being disposed in the outlet end of the conduit and wherein the individual exhaust stations of each series comprise means in the vicinity of each drying station for connecting the tunnel to the return header to effect withdrawal of moisture-laden drying air before said air interferes with drying air of controlled quality at other drying stations, said connecting means including means for controlling the quantity of air withdrawn therethrough so as to maintain sufficient positive air pressure in the tunnel to preclude infiltration of outside air.

4,173,080

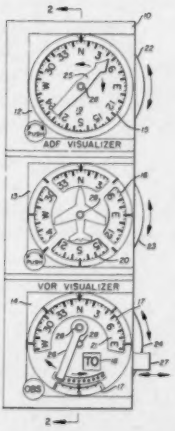
RADIO NAVIGATION TRAINING DEVICE

Paul Minnicks, III, 255 Lee Rd., Brookfield, Ohio 44403

Filed Mar. 17, 1978, Ser. No. 887,816

Int. Cl.[2] G09B *19/16*

U.S. Cl. 35—10.25 **3 Claims**



1. A navigation training device comprising:

an elongate base sheet folded about itself to define a front section and a back section;

a first arcuate cutout defined in said front section near the top of said front section;

a first arcuate disc centrally rotatably fixed to said back section, said first disc having compass markings thereon and being positioned in said first arcuate cutout so said compass markings are visible through said first cutout, said first disc having an outer diameter larger than said first cutout and having a portion extending beyond an edge of said front section so that said first disc can be hand rotated;

a first marker indicia on said base sheet face section immediately adjacent said first cutout;

a first pointer centrally rotatably mounted on said back section over said first disc to rotate with respect to said first disc;

a plurality of second arcuate cutouts defined in said front section to be circularly oriented and to be spaced from said first cutout;

a second arcuate disc centrally rotatably fixed to said back section at the center of said circularly oriented second cutouts, said second disc having compass markings thereon and being positioned so said compass markings are visible through said second cutouts, said second disc having an outer diameter larger than the outer diameter of said circular orientation of said second cutouts and having a portion extending beyond the edge of said front section so that said second disc can be hand rotated;

a second marker indicia on said base sheet face section immediately adjacent one of said second cutouts;

a circular disc section fixedly located on said base sheet front section having the center thereof coincident with the center of said second cutout circular orientation and having an outer peripheral edge coinciding with inner edges of said second cutouts;

a third marker indicia on said circular disc section;

a plurality of third arcuate cutouts defined in said front section to be circularly oriented and to be spaced from said first and second cutouts;

a third arcuate disc centrally rotatably fixed to said back section at the center of said circularly oriented third cutouts, said third disc having two sets of compass markings thereon and being positioned so that each set of said compass markings is visible through one of said third cutouts, said third disc having an outer diameter larger than the outer diameter of said circular orientation of said third cutouts and having a portion extending beyond the edge of said front section so that said third disc can be hand rotated;

a fourth marker indicia on said base sheet face section immediately adjacent one of said third cutouts;

a fifth marker indicia on said base sheet face section immediately adjacent another one of said third cutouts;

a semi-circular disc section fixedly located on said base sheet front section so that a diameter thereof passes through the center of said circularly oriented third cutouts;

a second pointer rotatably mounted at one end thereof on said base sheet front section at a location spaced from the center of said circularly oriented third cutouts;

a polygonal cutout defined in said base sheet front section; and

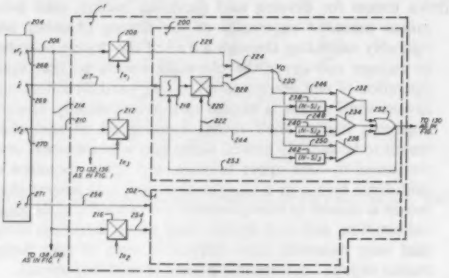
an elongate pull tab having indicia thereon and movably attached to said base sheet front section so said indicia will be visible through said polygonal cutout.

4,173,081

VIDEO GENERATOR FOR USE IN A SYNTHETIC TERRAIN GENERATOR

Maurice Millard, Binghamton; David L. Peters, Whitney Point; John R. Trzeciak, Binghamton, and Brian J. Woycechowsky, Vestal, all of N.Y., assignors to The Singer Company, Binghamton, N.Y.

Filed Mar. 14, 1978, Ser. No. 886,385
Int. Cl.[2] G09B 9/08
U.S. Cl. 35—12 N **11 Claims**



1. In a synthetic terrain generator which provides on a viewing surface of a display means, a simulated view from an eyepoint in an aircraft or the like, of a synthetic terrain having a plurality of grid lines in a reference plane, an improved video generator of the type which generates signals electronically defining null relationships, which are representative of an intersection of a line of sight from the eyepoint with a grid line, and provides a video pulse to the display means when horizontal and vertical earth direction cosine signals and signals representative of the altitude and horizontal velocity of the aircraft concurrently have values in accordance with the null relationships, wherein the improvement comprises:

(a) means to convert a signal representative of the altitude of the aircraft into a first scaling function signal (sf_1) and a second scaling function signal (sf_2) where each of the said functions are related to the signal representative of the altitude of the aircraft;

(b) first scaling means responsive to the first of said scaling function signals and said horizontal earth direction cosine signal to provide a scaled horizontal earth direction cosine signal proportional to said first scaling function signal;

(c) second scaling means responsive to the second of said scaling function signals and said vertical earth direction cosine signal to provide a scaled vertical earth direction cosine signal proportional to said second scaling function signal; and

(d) means responsive to said scaled earth direction cosine signals and signals representative of the horizontal velocity of the aircraft for electronically defining said null relationships, whereby said scaling provides improved signal strength magnitudes representative of terms of said null relationships so that signal processing over a selected altitude range will result in an accurate depiction of the synthetic terrain as the eyepoint varies from a minimum value of the selected altitude range to a maximum value of the selected altitude range.

4,173,082

PAPER FOR TEACHING WRITING SKILLS

Joan Niquette, 321 Jelliff Mill Rd., New Canaan, Conn. 06840

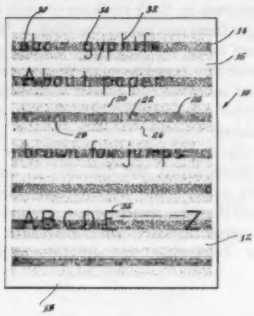
Filed Sep. 27, 1976, Ser. No. 726,586
Int. Cl.[2] G09B 11/04
U.S. Cl. 35—37 **7 Claims**

1. A writing surface for use as an aid in developing writing skills comprising:

a substantially planar surface,

a plurality of three module staffs on said surface, each of said three module staffs including

three contiguous colored bands connected along an interface characterized by the absence of a line to provide an upper, middle and lower writing zone, the middle one of said



bands being colored differently from said upper and lower zones so as to be distinctive, and

a non-colored area separating each of said three staff modules on said writing surface.

4,173,083

ATHLETIC SHOE CONSTRUCTION

Ralph J. Infusino, Bartlett, Ill., assignor to Riddell, Inc., Des Plaines, Ill.

Filed Jan. 16, 1978, Ser. No. 869,919

Int. Cl.[2] A43C *15/00*; A43B *5/02*

U.S. Cl. 36—59 R **4 Claims**

1. In a soccer shoe construction including a sole having cleats projecting therefrom, the improvement in the toe area of the sole comprising a plurality of spaced-apart ridges extending outwardly of the sole and transversely across the sole, said ridges being positioned substantially perpendicular to the longitudinal axis of the forward portion of the shoe, the forward surfaces of said ridges slanting downwardly and rearwardly relative to the sole, the more rearwardly located ridges extending outwardly a progressively greater distance than the more forwardly located ridges, and wherein a plurality of spaced-apart cleats are positioned on said sole rearwardly of said ridges.

4,173,084

SKI BOOTS

Bernhard Kirsch, Im Litzelholz 23, 5500 Trier-Biewer, Fed. Rep. of Germany

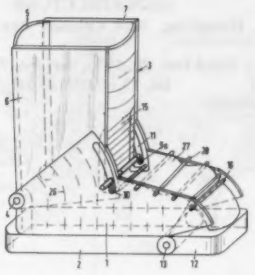
Filed Aug. 23, 1978, Ser. No. 936,084

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1977, 2738523

Int. Cl.[2] A43B *5/04*

U.S. Cl. 36—121 **21 Claims**

1. In a ski-boot of the kind comprising a bottom part to carry the foot and an ankle cuff which is pivotable on said bottom part of the boot about a first pivot shaft extending transversely to the longitudinal direction of the boot, both said bottom part and said ankle cuff being made from a rigid material, the invention which consists in that said ankle cuff has plane side-walls arranged parallel to and at a distance from one another which rest against the insides of plane side-walls sections of said bottom part of the boot which are respectively associated with them, in that said first pivot shaft connecting said ankle cuff and said bottom part of the boot is arranged above the sole of the boot and to the rear of an axis aligned with the ankle joint



of the intended wearer, (i.e. 5 to 10 cms above said boot sole) and in that at the front end said ankle cuff has a transverse pin orientated parallel to said pivot shaft whose ends are guided in a guide track of curved configuration in said bottom part of the boot.

4,173,085

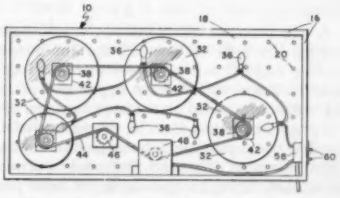
ANIMATED PAINTING

Pedro J. Cortez, 207 6th St., Calexico, Calif. 92231

Filed Sep. 15, 1977, Ser. No. 833,675

Int. Cl.[2] G09F *11/23*

U.S. Cl. 40—433 **1 Claim**



1. A light-animated picture comprising:

(a) an enclosing housing;

(b) said housing having a front panel having a pictoral display thereon which defines a plurality of different general areas of a single scene;

(c) said front panel having a multiplicity of transparent portions coincident with the locations of pictoral lights in said pictoral display and being partially transparent in other portions to produce a glow when backlighted;

(d) said housing interior being substantially completely silvered;

(e) a plurality of rotating members spaced along the rear surface of said front panel generally coincient with said general area journalled and on axes orthogonally related to said front panel, said rotating members each having coaxial drive sprockets and at least one opaque masking element to periodically cover said transparent portions;

(f) a motor mounted in said housing and a linear drive means engaged by said motor and encircling in driving relation all of said sprockets; and

(g) several light bulbs positioned on the side of said rotating members remote from said front panel and at least some of said light bulbs being directly behind respective ones of said rotating members to selectively and intermittently illuminate the general areas of said display in front thereof to provide a twinkling effect and others of said light bulbs providing constant illumination of portions of said front

panel in spaced areas between said rotating members whereby different areas of said display may be illuminated at different intensities by varying the strength of the individual light bulbs.

4,173,086

SIGN STRUCTURE

Walter L. Hempfling, 3028 Colerain Ave., Cincinnati, Ohio 45225

Filed Dec. 20, 1976, Ser. No. 752,798
Int. Cl.[2] G09F *15/00*
U.S. Cl. 40—607 **10 Claims**

1. A sign structure which includes a pole member, means for mounting the pole member in upright position, oppositely extending aligned side arms mounted on the pole member adjacent but spaced below an upper end thereof, and a sign panel member mounted on the upper portion of the pole member in gripping relation thereto, the sign panel member including a first panel portion, a bend portion and a second panel portion separated from the first panel portion by the bend portion, there being an opening in the bend portion receiving an upper end portion of the pole member with the inner side of the bend portion supported by the side arms and the first and second panel portions respectively embracingly contacting the pole member therebetween.

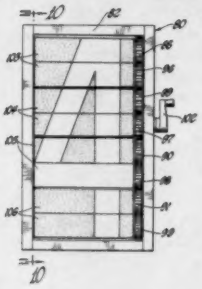
4,173,087

CHANGEABLE PRINTED ALPHANUMERIC DISPLAY MODULE

William H. Saylor, 31791 S. Coast Hwy., South Laguna, Calif. 92677, and James O. Narey, 14331 Purdy St., Westminster, Calif. 92683

Continuation of Ser. No. 637,433, Dec. 3, 1975, Pat. No. 4,064,503, which is a continuation-in-part of Ser. No. 546,696, Feb. 3, 1975. This application May 16, 1977, Ser. No. 796,940
Int. Cl.[2] G09F *11/18*
U.S. Cl. 40—518 **2 Claims**

1. A sign module for forming a display of a set of alphanumeric characters one at a time in a viewing window, said module comprising: a set of display tapes, each tape being imprinted on both front and back surfaces at discrete surface segments along its length with a discrete character segment of one character, all character segments on the front surface of a given tape corresponding to the same relative part of the different characters, and all character segments on the back surface of a given tape corresponding to the same relative part of the different characters, the number of display tapes in the set being equal to one-half the number of character segments presented at a time in said viewing window, a driving roller and a slave roller for each tape connected with opposite ends of the respective tape and supporting the respective tape with one surface segment of each surface being displayed in said window at a portion of the window which is in positional correspondence with the character segment represented, the surface segments on both surfaces of each tape being progressively longer from one end of the tape to the other, the character segments being nonuniformly spaced along the length of the tape whereby equal angular displacements of the driving roller causes successive character segments to be aligned with the respective window portions, the set of surface segments being displayed together in said window all bearing different character segments of the same character whereby an entire character is displayed, the diameter of each roller being approximately equal to the length of one surface segment along the length of the tape, the driving and slave rollers for all tapes in the set being disposed with their axes in the same plane, means for displacing the driving rollers simultaneously



through equal angles for displacing said tapes in unison along their length to successively present the character segments in registry with the respective window portions whereby the characters of said set are successively displayed, each of the driving rollers and each of the slave rollers being mounted upon a shaft, said means for displacing including a driving roller gear connected with the shaft of each driving roller and a slave roller gear connected with the shaft of each slave roller, all gears being of the same size, the driving roller gear associated with any tape being in mesh with the slave roller gear associated with the same tape and only one of the gears associated with each tape being in mesh with one of the gears associated with another tape, each of said slave rollers being provided with a spring drivingly connected between the roller and its respective shaft whereby the tape on each pair of driving and slave rollers is maintained in tension and differential rotation between a slave roller and its shaft is taken up by the respective spring.

4,173,088

TOY GUN OF THE REVOLVER TYPE AND LAMINAR AMMUNITION THEREFOR

Anthony M. Caruso, Sarasota, Fla.

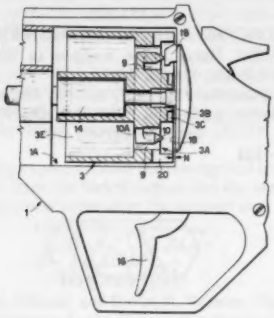
Filed Aug. 18, 1977, Ser. No. 825,588
Int. Cl.[2] F41C *3/06*
U.S. Cl. 42—58 **13 Claims**

1. A toy gun of the repetitive action revolver-type capable of employing various types of laminar ammunition having charges, said toy gun including a rotatable cylinder head provided with a plurality of chambers, and a percussion anvil associated with each of said chambers for cup-like ammunition, the improvement comprising:

indexing means associated with said cylinder head including at least one shoulder having a plurality of perimetral sides, said shoulder extending from said cylinder head axially thereof and having a plurality of concave sides,

said laminar ammunition having a central opening with a

plurality of convex sides complementary to said concave sides for engagement therewith and positioning of the charges onto said anvils, and



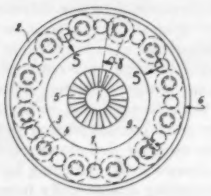
said plurality of perimetral sides being related to the number of said anvils in multiples thereof to assure angular positioning of a correspondingly-shaped laminar ammunition having charges equal to the number of said chambers centered onto said anvils.

4,173,089

AMMUNITION FOR A TOY PISTOL

Eric Gruaz, 4 Avenue Marechal Foch, Lyon, France

Filed Nov. 7, 1977, Ser. No. 849,251
Claims priority, application France, Nov. 8, 1976, 76 34375
Int. Cl.[2] F41C *3/06*; F42B *4/24*
U.S. Cl. 42—58 **5 Claims**



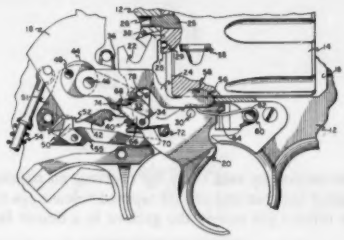
1. A munition disk for a toy revolver having a barrel provided with a plurality of angularly equispaced recessed seats and an anvil disposed centrally in each of said seats, said disk being formed with a multiplicity of angularly spaced explosive-charge capsules of a number twice that of the seats of said revolver and being engageable with said barrel, one of the faces of said disk being percussible to fire successive capsules, the opposite face of said disk being provided with at least two projections engageable in respective ones of said seats to one side or the other of the respective anvil, said capsules being dimensioned such that alternate capsules are axially aligned with said anvils when said projections lie to one side of the anvils in the seats in which said projections are received and the remaining capsules are axially aligned with said anvils when said projections lie to the opposite sides of the anvils of the seats in which the projections are received, and a pair of disk elements, one of said disk elements being formed along a face with a plurality of angularly equispaced recesses of identical depth receiving respective explosive charges adapted to form said capsules, and being provided with said projections on an opposite face of said one of said disk elements, the other of said disk elements closing said capsules along said one of said faces of said one of said disk elements, all of the capsules on the disk being identical, said other of said disk elements being composed of a thin sheet, said one of said disk elements being thicker than said other of said disk elements.

4,173,090

CYLINDER-LOCKING DEVICE FOR REVOLVERS

Richard L. Baker, Granby, Conn., assignor to High Standard, Inc., East Hartford, Conn.

Filed May 11, 1978, Ser. No. 905,043
Int. Cl.[2] F41C *1/00*
U.S. Cl. 42—67 **8 Claims**



1. In a double-action revolver having a cylinder rotatably mounted in a frame for intermittent movement into a plurality of positions and a trigger pivoted on a trigger pin on said frame for movement between a rest position and a firing position, a cylinder-locking device for maintaining said cylinder in each of its positions comprising

a cylinder lock pivoted on said frame for movement into and out of a locking position with respect to said cylinder and resiliently urged into such locking position,

an actuator for pivoting said cylinder lock out of its locking position in order to permit said cylinder to be indexed to another position, said actuator being mounted on said trigger for pivotal movement about a point located intermediate the trigger pin and the pivot point of said cylinder lock, said actuator having a nose portion for operative engagement with said cylinder lock,

means for resiliently pivoting said nose portion of said actuator into engagement with said cylinder lock,

said cylinder lock having a working surface disposed for co-operative engagement by said nose portion for pivoting said cylinder lock out of its locking position,

the pivot point of said actuator being disposed, when said trigger is in its rest position, out of alignment with the pivot points of said trigger and cylinder lock in a direction such that upon movement of said trigger from its rest position, the pivot point of said actuator is moved toward alignment with said other pivot points thereby producing a toggle action,

said nose portion of said actuator being disposed in an operative relationship with said working surface when said trigger is in its rest position for engagement with said working surface when said trigger is pulled, whereby said cylinder lock is pivoted by said actuator out of engagement with said cylinder during the initial travel of said trigger toward its firing position.

4,173,091

DOWN RIGGER LINE RELEASE

John E. Emory, Jr., Traverse City, Mich., assignor to Big Jon, Inc., Traverse City, Mich.

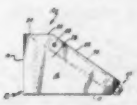
Filed Aug. 26, 1977, Ser. No. 827,891
Int. Cl.[2] A01K *91/00*
U.S. Cl. 43—43.12 **14 Claims**

1. A down rigger line release for releasably holding a fishing line relative to a down rigger line, said release comprising:

a body attachable to the down rigger line and defining an upwardly opening groove having vertically oriented, spaced sidewalls, said groove being angled downwardly at an acute angle from horizontal;

a tapered release pin having a tapered portion and being pivotally mounted at one end within said groove about an axis perpendicular to said sidewalls and around the ta-

pered portion of which the fishing line may be wrapped so as to normally be wedged between said release pin and said body groove sidewalls, said pin being pivoted about an axis perpendicular to the sidewalls of said groove; and



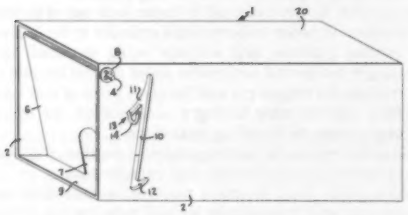
means carried by said body for exerting an adjustable force against the free end of said tapered release pin to maintain the release pin within the groove in a detent fashion.

4,173,092

RAT CAPTURING DEVICE

Tadanobu Nakai, Nara, Japan, assignor to Tokiwa Chemical Industries Limited, Osaka, Japan

Filed Nov. 14, 1977, Ser. No. 851,595
Claims priority, application Japan, Apr. 7, 1977, 52-43681[U]
Int. Cl.[2] A01M *23/18*
U.S. Cl. 43—61 **4 Claims**



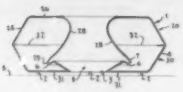
1. An animal trap comprising an elongated hollow box-like housing having first and second side walls, a bottom wall and an end wall and an open end portion, a movable closure, a pivot shaft extending between said side walls supporting said movable closure for pivotal movement about an upper portion of said closure so that said closure is movable between a closed position blocking the open end portion of said housing and an open portion to permit the passage of a rat into the interior of said housing, latch means mounted in said housing for movement between an unlatching position permitting opening movement of said closure and a latching position preventing movement of said closure from its closed position, said latch means comprising a latch shaft extending across the interior of said housing between said side walls inwardly of said closure member and latch actuator means supporting said latch means for movement from its unlatching position to its latched position in response to movement of said closure from its closed position to its open position followed by movement of said closure to its closed position and wherein said latch actuator means comprises first and second aligned wall slot means respectively provided in said side walls, the respective ends of said latch shaft being mounted in said respective wall slot means for movement therealong with each of said wall slot means comprising a main vertically extending canted slot portion having a lower end termination and an upper end termination with said upper end termination being spaced inwardly of said housing from said movable closure a greater distance than said lower end termination of said main vertically extending slot portion and wherein each of said wall slot means further includes upper and lower slot portions respectively connected to the upper and lower ends of said main vertically extending slot portion and respectively extending forwardly and rearwardly at a canted angle with respect to said main vertically extending slot portion.

4,173,093

COCKROACH CATCHING DEVICE

Tadanobu Nakai, Nara, Japan, assignor to Tokiwa Chemical Industries Limited, Osaka, Japan

Filed Nov. 14, 1977, Ser. No. 851,594
Claims priority, application Japan, Jun. 27, 1977, 52-84867[U]
Int. Cl.[2] A01M *1/10*
U.S. Cl. 43—121 **2 Claims**



1. A cockroach catching device comprising a hollow housing of generally circular configuration as viewed from above including means defining a floor portion of annular configuration, means supporting said floor portion a predetermined spaced distance above a supporting surface, a downwardly facing entrance opening provided adjacent said floor portion, inclined passageway panel means formed of non-perforated material extending upwardly and outwardly flaring from said entrance opening, said passageway panel means having an edge termination spaced above said floor portion, downwardly extending means positioned above said passageway panel means and having a lower edge portion spaced from the edge termination of said passageway panel means to define an entrance slot therebetween, said entrance slot being of sufficient width to permit a cockroach to pass therebetween to enter said housing, said entrance slot being positioned above said floor portion and dimensioned so as to preclude exit of a cockroach from said housing through said entrance slot wherein said downwardly facing entrance opening is provided axially with respect to said floor portion, said inclined passageway panel comprises an inverted conical section portion extending upwardly from the edge of said downwardly facing entrance opening and a downwardly extending lip portion of conical section shape extending downwardly from the upper edge of said inclined passageway panel and having a lower edge portion comprising said edge termination of said passageway panel means and wherein said housing includes an upper portion and a lower portion joined along a medial juncture, said upper portion including a flat annular upper surface and a downwardly and outwardly inclined conical panel having a lower edge terminating at said medial juncture and said lower portion includes said annular floor portion and an upwardly and outwardly inclined slanting conical surface wall having an upper edge terminating at said medial juncture.

4,173,094

METHOD FOR TREATING GROUND SURFACES WITH A TOXIC AGENT

Wallace H. Nichols, Jr., 4752 Lark Ridge Cir., Sarasota, Fla. 33581

Filed Nov. 17, 1977, Ser. No. 852,315
Int. Cl.[2] A01M *17/00*
U.S. Cl. 43—129 **5 Claims**

1. A method of dispensing a toxic agent over a ground area comprising:

(a) providing a fuel mixture comprising a mixture of a minor amount of one or more toxic agents effective to control target pests with a major amount of internal combustion engine fuel. the proportion of fuel in said mixture being sufficient to enable operation of an internal combustion

engine fueled thereby, said toxic agents being selected from the class consisting of insecticides, fumigants and herbicides which are soluble in said fuel and refractory to fuel combustion conditions of the fueled engine, said toxic agents being present in said mixture in an amount at least sufficient to provide in the exhaust of the fueled engine, an amount of said toxic agent which is effective against such target pests;

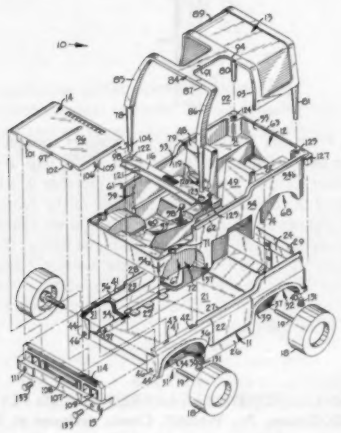
(b) supplying said fuel mixture to the combustion chamber of the internal combustion engine operating a ground vehicle while the vehicle is moving over the ground, the fuel in said mixture being substantially completely combusted; and

(c) discharging engine exhaust containing said toxic agent in vapor form from the fueled engine into the atmosphere to deposit said toxic agent over the ground area.

4,173,095
TOY VEHICLE

Ronald R. Pauly, Mound, and Royce D. Rumsey, Hopkins, both of Minn., assignors to Tonka Corporation, Spring Park, Minn.

Filed May 9, 1977, Ser. No. 794,729
Int. Cl.[2] A63H *17/00*
U.S. Cl. 46—201 **15 Claims**



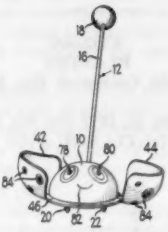
1. A toy vehicle comprising wheels, a chassis, simulated passenger compartment and cab roof, said chassis including a bottom pan, upwardly extending sides, and a plurality of wheel wells, said cab roof including a plurality of substantially vertically oriented, downwardly extending posts, said posts extending to a position adjacent said bottom pan, said posts serving to support said cab roof directly on said bottom pan, said posts securing said passenger compartment to said chassis whereby any external forces applied to the cab roof are transmitted through said posts to said bottom pan.

4,173,096
WHEELED TOY

Burton C. Meyer, Downers Grove, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Nov. 21, 1977, Ser. No. 853,271
Int. Cl.[2] A63H *29/00*
U.S. Cl. 46—205 **14 Claims**

1. A wheeled toy, comprising: a frame including a vertically extending post, wheel means journaled in said frame for rollingly supporting said frame for movement over a support surface, an elongated handle connected to said frame and adapted to be grasped by a user for manually moving the toy over the support surface, a body portion fixedly connected to the upper end of said post, an inner member rotatably mounted on said post beneath said body portion and having an edge portion extending beyond the periphery of said body portion, drive means interconnecting said wheel means and said inner member so that said inner member is rotated as the toy is rolled

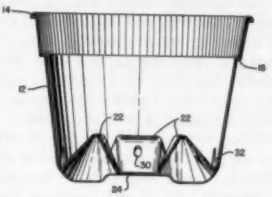


over a support surface, at least one cover member pivotally connected to said edge portion of said inner member, and means for normally positioning said cover member over said body portion while permitting said cover member to move outwardly by centrifugal force when said inner member is rotated as the toy is moved over a support surface.

4,173,097
CONTAINER WITH RAISED INDENTATIONS FOR AERATION AND DRAINAGE

George L. Staby, 1170 Slade Ave., Columbus, Ohio 43220

Filed Sep. 14, 1977, Ser. No. 833,055
Int. Cl.[2] A01G *9/02*
U.S. Cl. 47—66 **2 Claims**



1. A container adapted for holding a growing media suitable for plants comprising:

a bottom wall connected to a circumferentially extending side wall which together define an open topped container having an inside surface and an outside surface;

an outwardly projecting lip at the open top and a shoulder projecting outwardly from said side wall intermediate the bottom and the lip;

said bottom wall including four raised sections projecting symmetrically upwardly into said container about ⅓ the height thereof around a central bottom portion, each raised section tapering inwardly toward the top of the container, the central bottom portion being free of raised sections;

a plurality of first drainage holes extending through the lowermost portion of said bottom wall;

at least one other drainage hole projecting through each raised section to minimize the distance from a drainage hole to parts of the media;

arched air passageways in the exterior bottom surface of the container in communication with the drainage holes in the raised sections, the number of arched passageways corresponding to the number of raised sections, each arched passageway extending from the side wall to the center of the container bottom and between two of said first drainage holes;

four radially extending passageways, each passageway ex-

tending between two raised sections and sloping downward from the central bottom portion to one of said first drainage holes; and

additional drainage holes, each additional hole extending through both the side wall at an arched passageway and the associated raised section.

4,173,098

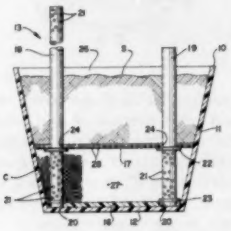
PLANTER

Elmer L. Smith, 6090 Cedarwood Rd., Mentor-on-the-Lake, Ohio 44060

Filed May 31, 1977, Ser. No. 801,530

Int. Cl.[2] A01G *27/00*

U.S. Cl. 47—80 **7 Claims**



1. A planter comprising a receptacle open at the top and having an imperforate bottom wall;

a removable insert structure for said receptacle, said structure comprising a flat bottom support member disposed on said bottom wall, said support member having a plurality of sockets spaced outwardly from the center thereof;

a horizontal wall disposed within said receptacle above said bottom support member and dividing said receptacle into upper and lower compartments, said horizontal wall having a plurality of apertures aligned with said sockets;

a pair of tubular members each having a pair of radially outwardly projecting support rings spaced axially along said tubular member, a lower end portion of each said tubular member being disposed in one of said sockets and one of said support rings abutting the top of said bottom support member, each said tubular member projecting upwardly through one of said apertures and above said horizontal wall, the other of said support rings being disposed below and supporting said horizontal wall;

said horizontal wall being perforated to allow air and water to pass therethrough while retaining soil in said upper compartment;

the lower end portion of each said tubular member which is disposed within said lower compartment being perforated to allow air and water to pass radially therethrough;

said upper compartment adapted to hold soil to a level below the upper ends of said tubular members whereby when excess water from said soil passes through said perforated horizontal wall and collects in said lower compartment, said tubular members provide means for air circulation and evaporation within said lower compartment, and said perforated wall portion provides means for humid air to aerate said soil and keep it moist.

4,173,099

PET DOORS

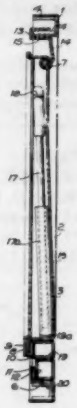
Donald Robb, Penwortham, England, assignor to Reilor Limited, Lancaster, England

Filed Jul. 24, 1978, Ser. No. 927,722

Int. Cl.[2] E06B *7/28*

U.S. Cl. 49—168 **3 Claims**

1. A pet door mounting in an opening in an existing door, of the kind capable of being opened from both sides comprising a rectangular frame of channel shape extruding from a plastics material for attachment to a door opening, the inner member of the channels on the sides and bottom of the frame being provided with inwardly extending flanges, a second rectangular channel frame of substantially U shape extruded from a plastics material to engage the flanges on the rectangular frame, reinforcing moulded channel corner members welded inside the channels of the rectangular frame with holes in the upper reinforcing members to provide sockets for the ends of a rod on which the second frame is pivoted, a door flap pivoted on the rod inwardly of the second frame to open in the opposite



direction from the second frame, a magnet mounted on the outer side of the flange on the bottom of the flap to engage a metal keeper forming one side of a box member welded to the inner side of the bottom channel member of the second frame, a second magnet being mounted on the bottom channel member of the second frame parallel to the metal keeper thereon for engagement by a keeper on the outer bottom flange of the rectangular frame and bolts mounted to slide in the flap to engage the rectangular frame and the second frame to prevent the door from opening.

4,173,100

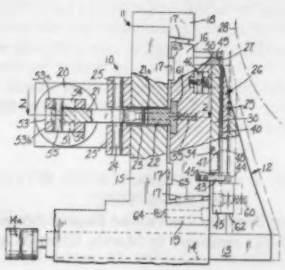
CANNULA GRINDING CARTRIDGE AND FIXTURE

James MacBroom, Jr., Wolcott, Conn., assignor to Toolmatic Corporation of Connecticut, North Branford, Conn.

Filed Feb. 3, 1978, Ser. No. 874,942

Int. Cl.[2] B24B *19/00*

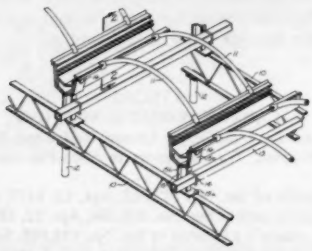
U.S. Cl. 51—227 H **10 Claims**



1. A cartridge for holding a multiplicity of cannulas in side-by-side relation for grinding comprising, a base plate and a facing cover plate, a plurality of spaced apart springs interposed between said plates adjacent one end thereof and urging the other ends thereof together, means defining a shoulder for the ends of cannulas between said plates and intermediate said ends, and means connecting said plates between said springs

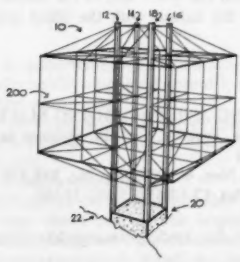
and said other ends and permitting pivotal movement of said plates with and against the force of said springs and also permitting small relative longitudinal movement of said plates in a direction essentially perpendicular to the directed force of said springs.

4,173,101
GREENHOUSE GUTTER ASSEMBLY
Aart Van Wingerden, R.R. 2, Fletcher, N.C. 28732
Filed Nov. 7, 1977, Ser. No. 849,443
Int. Cl.[2] E04D *13/06*
U.S. Cl. 52—13 **5 Claims**



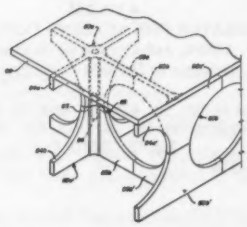
1. A greenhouse gutter assembly comprising:
an extruded channel member having a horizontal drainage bottom and an upper side projecting upwardly adjacent each end of said gutter bottom;
a lower side projecting downwardly adjacent each end of said gutter bottom integral therewith;
a horizontal insulating bottom spaced below said drainage bottom extending between said lower sides; and
means positioning said insulating bottom forming together with said lower sides an insulating air space below and extending across said drainage bottom including a cam member carried adjacent a lower end of each of said lower sides, and a bracket carried adjacent each side of said insulating bottom for encompassing said cam;
whereby said air space serves to insulate the greenhouse and said lower sides enhance the structural characteristics of the gutter.

4,173,102
BUILDING CONSTRUCTION
Bernard Judge, 833 N. Kings Rd., Los Angeles, Calif. 90069
Filed Jun. 28, 1977, Ser. No. 811,131
Int. Cl.[2] E04B *1/34*
U.S. Cl. 52—73 **5 Claims**



1. A building construction comprising:
a central support structure including four rigid vertical columns lying at the vertices of a rectangle and fixed at their lower ends to the ground;
a set of trusses including two mutually perpendicular pairs of parallel trusses, each truss including:
a horizontal chord;
a second chord fixed at its ends to the ends of the horizontal chord and being elsewhere vertically spaced therefrom, said chords being fixed intermediate their ends to two adjacent columns at vertically spaced attachment zones, whereby each column segment between the attachment zones serves as a spreader for mutually perpendicular truses;
a horizontally disposed connector extending between and fixed to adjacent ends of each pair of parallel trusses;
horizontally disposed elongated structural members projecting in opposite prolongation of each connector, each joined at its outer end with the outer end of another such member at a hip point;
and a hip strut extending from each hip point to the adjacent column at an attachment zone spaced from the attachment zone of the horizontal chord.

4,173,103
LIGHT-WEIGHT STRUCTURAL SYSTEM AND MODULAR CONCRETE BUILDING COMPONENTS THEREFOR
Sargis E. Sargis, 6195 Springer Way, San Jose, Calif. 95123
Division of Ser. No. 529,344, Dec. 4, 1974, Pat. No. 4,041,666.
This application May 27, 1977, Ser. No. 801,217
Int. Cl.[2] E04B *2/00*
U.S. Cl. 52—79.13 **3 Claims**

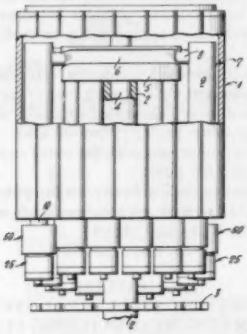


1. In a multiplanar structural system, a capital member of concrete having an axially extending central portion and having, integrally formed therewith a plurality of arcuate quarter-panel wall sections extending radially from said central portion in planes mutually intersecting along the axis of said member, each said arcuate quarter-panel wall section extending over a circular arc of substantially 90° , and having two end faces disposed for cooperation with the end faces of complementary arcuate quarter-panel wall sections of similar, vertically and horizontally adjacent capital members so that when said first-mentioned arcuate quarter-panel wall section is joined in coplanar, generally end-to-end abutting relationship to the arcuate quarter-panel wall sections of said similar members, the quarter-panel wall sections so joined form themselves a substantially rectangular, vertical-and-horizontal-load bearing wall panel with a central, weight reducing circular opening therethrough.

4,173,104
BOTTLE CAPPING APPARATUS AND METHOD
Stanley J. Koll, Keansburg, N.J., assignor to American Flange & Manufacturing Co., Inc., Linden, N.J.
Filed Apr. 17, 1978, Ser. No. 897,197
Int. Cl.[2] B65B *7/28, 59/04;* B67B *3/14, 3/12*
U.S. Cl. 53—201 **4 Claims**

1. In closure cap applying apparatus, a reciprocally mounted

work imparting shaft, a self-contained compensator spring unit attached as a structurally independent mechanism to the lowermost working end of said shaft so as to depend therebelow said compensator spring unit including a cylindrical housing having one end closed and an open end, a plunger member telescopically fitted within said open end so as to be principally



confined within said housing, compression spring means peripherally disposed within said housing for resiliently urging said plunger member axially away from said closed end, and a closure cap applying head axially connected to said compensator unit whereby variations in travel distance between said work imparting shaft and said closure cap applying head are accommodated by said self-contained compensator spring unit.

4,173,105

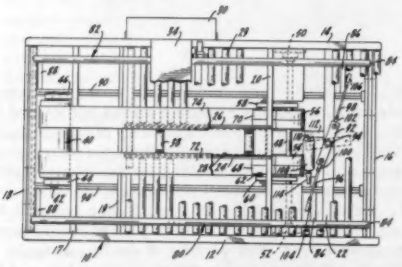
APPARATUS FOR SEALING CONTAINERS

Lawrence W. Ulrich, and Connie W. Walker, both of Bolingbrook, Ill., assignors to Durable Packaging Corporation, Chicago, Ill.

Continuation of Ser. No. 828,272, Aug. 29, 1977, abandoned. This application Jun. 26, 1978, Ser. No. 918,787

Int. Cl.[2] B65B *7/20*

U.S. Cl. 53—374 **1 Claim**



1. Apparatus of the type used for sealing the foldable flaps of cartons of random sizes, said apparatus including a frame structure, a vertically movable sealing head means mounted to said frame structure, a longitudinally extending bottom belt carton conveying means rigidly mounted to said frame structure, and an improved side arm assembly means engagable with opposite sides of said carton for centering and guiding said carton through said sealing head means; said side arm assembly comprising:

(a) first and second longitudinally extending side arm members positioned on opposite sides of the longitudinal center axis of said apparatus, said side arm members being mounted to and extending upward from said frame structure for pivotal movement about a substantially horizontal axis;

(b) a pneumatic cylinder having a first end pivotally secured to said frame structure and a second end pivotally secured to said first side arm member so as to effect pivotal movement of said first side arm member towards and away from the longitudinal center axis of said apparatus;

(c) a flat plate member rotatably mounted about a vertical axis to said frame structure along the longitudinal center axis of said frame structure and outside the longitudinal extent of said carton conveying means; and

(d) first and second straight tie rods having first ends universally secured to opposing ends of said plate member and second ends universally secured to a respective first and second side arm member such that pivot movement of said first side arm member is translated through said first tie rod to rotate said plate member which in turn translates a simultaneous pivotal movement to said second side arm member through said second tie rod.

4,173,106

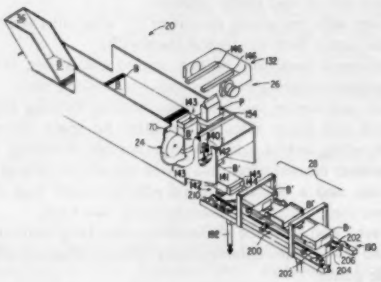
CARTON FORMING METHOD

William Leasure; Luis Garcia; Charles Reifel, and Jack Shelton, all of Houston, Tex., assignors to Mira-Pak Inc., Houston, Tex.

Continuation of Ser. No. 787,062, Apr. 13, 1977, which is a continuation-in-part of Ser. No. 570,504, Apr. 22, 1975, Pat. No. 4,027,579, which is a division of Ser. No. 614,903, Sep. 19, 1975, Pat. No. 4,024,693. This application Aug. 3, 1978, Ser. No. 930,523

Int. Cl.[2] B65B *5/04*

U.S. Cl. 53—449 **4 Claims**



1. A method of forming a bag and box package comprising the steps of forming, filling and sealing a bag, bringing a carton having both ends thereof open into a position beneath the formed, filled and sealed bag, providing a support for the open lower end of the carton, lowering the filled bag into the carton wherein the lower end of the bag is held in a position in alignment with the lower end of the carton by the support, removing the support from the lower end of the carton, and sealing the open ends of the carton with the filled and sealed bag therein.

4,173,107

COLLATING AND PACKAGING MACHINE

Wilfred W. Wilson, Toronto, Canada, assignor to Gemel Ltd., Toronto, Canada

Filed Nov. 4, 1977, Ser. No. 848,479

Int. Cl.[2] B65B *5/10, 35/40*

U.S. Cl. 53—534 **7 Claims**

1. An apparatus for loading sausage-like items into trays comprising:

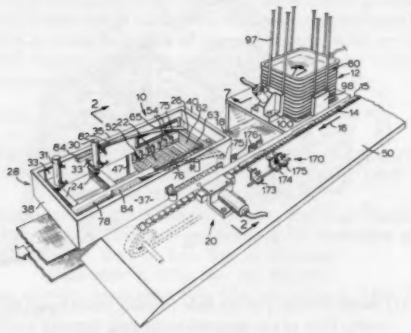
a first endless conveyor for passing the items sequentially along a straight path in a forward direction,

a second endless conveyor laterally adjacent to the first endless conveyor, for carrying trays sequentially in said forward direction,

dispensing means for depositing sequential trays onto said second conveyor,

loader means adjacent the first conveyor on the other side from the second conveyor, the loader means being adapted to displace items laterally off said first conveyor toward the second conveyor,

a table surface suspended over said second conveyor forwardly of said dispensing means and adapted to receive



said items displaced by the loader means, the table surface having a free forward edge above the second conveyor, means for arresting a tray on said second conveyor such that at least part of the tray projects forwardly beneath said free forward edge,

and reciprocating pusher means above said table surface for pushing off said surface and into the tray items collected on said surface.

4,173,108

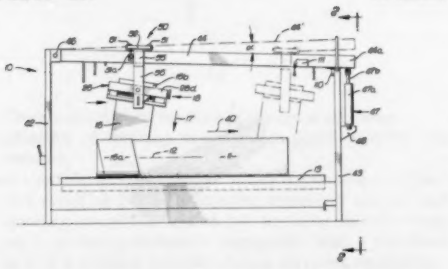
SPIRAL WRAPPING APPARATUS

Robert B. Eglinton, Huntington Beach, and James L. Tuell, Manhattan Beach, both of Calif., assignors to Chromalloy American Corporation, New York, N.Y.

Filed Mar. 27, 1978, Ser. No. 890,540

Int. Cl.[2] B65B *11/04*

U.S. Cl. 53—587 **10 Claims**



1. For use in spiral wrapping a sheet about a longitudinally and horizontally axially elongated generally cylindrical object, the combination comprising

(a) a frame including a beam member extending in the general direction of said object axis, and at a higher elevation than said axis,

(b) means to rotate said object,

(c) support structure carried by the beam to support a sheet roll to rotate about another axis angled from horizontal and to directionally feed the sheet toward and into parallel and close tangency to the object, in a skew feed direction relative to the other axis, in response to rotation of the object,

(d) the beam member tilted at a downhill angle such that tension developed in the sheet during said feed thereof produces a force sufficient in itself to displace the support structure lengthwise along the beam member whereby as the object is rotated about its axis said sheet is fed from said roll and becomes progressively spirally wrapped about the object, and said displacement being at a speed corresponding to the axial rate of spiral wrap advancement along the object,

(e) the support structure supported to pivot in the same angular tilt direction as said beam, and independently of beam tilt.

4,173,109

ANIMAL HALTER

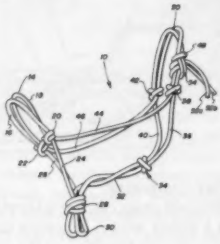
William T. Hibbert, Rte. 2, Box 44, Breckenridge, Tex. 76024

Continuation of Ser. No. 714,140, Aug. 13, 1976, Pat. No. 4,106,266. This application Apr. 13, 1978, Ser. No. 896,091

The portion of the term of this patent subsequent to Aug. 15, 1995, has been disclaimed.

Int. Cl.[2] B68B *1/02*

U.S. Cl. 54—24 **6 Claims**



1. An animal halter, comprising:

a plurality of fixed length segments being formed from a continuous length of line, said segments of the halter being formed and joined together by a plurality of fixed non-slip knots;

an adjustable neck band segment being formed from said length of line and being joined together by an adjustable knot; and

a lead loop being formed from said line for attaching a lead to the halter.

4,173,110

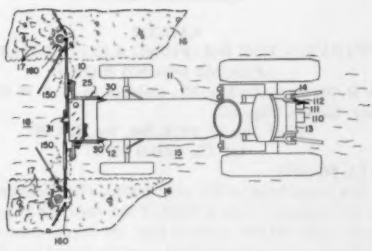
SELF-ACTING IMPLEMENT

Bobbie F. Hansen, Jr., 5393 N. Rolinda, Fresno, Calif. 93705

Filed Jan. 6, 1978, Ser. No. 867,439

Int. Cl.[2] A01D *45/10*

U.S. Cl. 56—10.2 **10 Claims**



6. An implement for cutting canes and the like of a row crop while being borne by a vehicle, having a selectively operable work performing system individual thereto, along a path of travel substantially parallel to said row crop, the implement comprising a cutting head; means for mounting the cutting

head on the vehicle for movement along a path to and from an extended cutting position; means for moving the cutting head along said path; and control means operatively interconnecting the work performing system of the vehicle and the moving means of the implement for operating said moving means of the implement in response to operation of the work performing system of the vehicle.

4,173,111

VENTED GRASS-CATCHER COVER

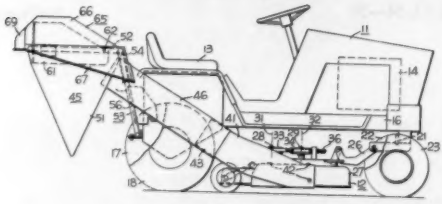
James F. Peterson, Cedarburg, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Aug. 18, 1977, Ser. No. 825,531

The portion of the term of this patent subsequent to Sep. 13, 1994, has been disclaimed.

Int. Cl.[2] A01D *35/22*

U.S. Cl. 56—202 **5 Claims**



1. A grass catcher comprising:

support means for said grass catcher adapted for connection to the rear of a riding mower whereby said grass catcher is mounted in an elevated position at the rear thereof when installed thereon,

an upwardly opening receptacle secured to said support means, and

a cover structure releasably mounted on the top of said receptacle including

a rigid impervious cover having a main part resting on said receptacle and a rearwardly extending louver at the rear of said main part, said louver extending rearwardly of said receptacle and presenting a downwardly facing discharge opening extending substantially the full transverse width of said receptacle, the inside of said louver constituting a discharge passage connecting the interior of said cover with said discharge opening, said discharge opening being at substantially the same elevation as the top of said receptacle, and

a vertically disposed screen secured to and within said cover across said discharge passage adjacent the junction of said louver with said main part of said cover whereby grass clippings hitting said vertically disposed screen will tend to fall by gravity into said receptacle.

4,173,112

APPARATUS FOR WRAPPING A COVER MATERIAL AROUND ROUND BALES

Elmo R. Meiners, Anchor, Ill., assignor to M & W Gear Company, Gibson City, Ill.

Filed Jul. 27, 1978, Ser. No. 928,507

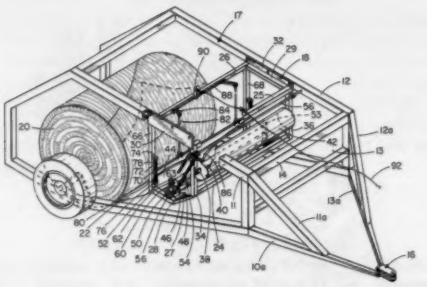
Int. Cl.[2] A01D *39/00*

U.S. Cl. 56—341 **9 Claims**

1. In a round baler of the type having a bale forming mechanism for transport over a field of cut material to gather and form the material into a round bale, the improvement of apparatus for applying a cover sheet over the round bale during the bale forming operation, said improvement comprising in combination:

(a) a wrapping material roll storage member affixed to the baler forward of the bale forming mechanism, said roll storage member being oriented to position an end of a sheet of wrapping material on the roll member in the path of the cut material for wrapping the bale as the bale is being formed;

(b) drive means for the storage member for removing the sheet of wrapping material from the roll member and directing the end of said sheet along the ground for gathering by the bale forming mechanism about the outside surface of the formed bale;



(c) means forward of the bale forming mechanism for terminating flow of cut material to the bale forming mechanism;

(d) means for cutting the wrapping material intermediate the bale forming mechanism and the roll storage member; and

(e) means for affixing a cut end of sheet material to a bale formed by the bale forming mechanism.

4,173,113

THERMALLY STABLE HELICALLY PLIED CABLE

Donald L. Sneliman, and Willard G. Hudson, both of Seattle, Wash., assignors to Norfin, Inc., Seattle, Wash.

Continuation-in-part of Ser. No. 466,174, May 2, 1974, abandoned, which is a division of Ser. No. 311,361, Dec. 1, 1972, Pat. No. 3,821,879. This application Mar. 7, 1975, Ser. No. 556,090

The portion of the term of this patent subsequent to Jul. 2, 1991, has been disclaimed.

Int. Cl.[2] D02G *3/18, 3/40;* **D07B** *1/02, 1/16*

U.S. Cl. 57—249 **40 Claims**

1. A cable, comprising: tensile load bearing elements which can change in length in response to variation in temperature; and thermal radial expansion means operably associated with said load bearing elements in sufficient quantity that overall cable length may be controlled under varying temperature conditions by producing change in the cross sectional area of the cable in opposition to and substantially simultaneously with change in length of said load bearing elements.

24. A method of making a glass fiber cable, comprising the steps of:

helically winding a plurality of glass fiber rovings to form successive layers of increasing diameter;

surrounding the filaments of each roving with an uncured elastomeric resin having a curing agent or hardener in contact therewith to form an elastomeric cable matrix; and

maintaining the helical angle of the initial and successive layers during lay-up at a substantially constant value selected to provide cured elastomeric resin in sufficient quantity that thermal elongation of the cable produced by thermal elongation of the filaments can be nulled by simultaneous increase in cable cross sectional area produced by thermal radial expansion of the cable matrix, whereby the cable remains essentially constant in length under varying temperatures.

4,173,114

OPEN-END SPINNING MACHINE WITH A PLURALITY OF SPINNING ASSEMBLIES AND AT LEAST ONE MOBILE SERVICING DEVICE

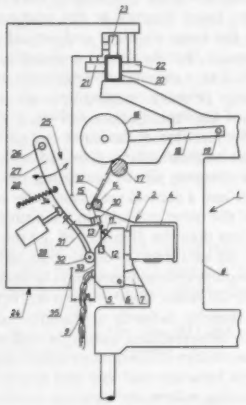
Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7341 Bad Überkingen, Fed. Rep. of Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany

Filed Mar. 8, 1978, Ser. No. 884,572

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1977, 2711163

Int. Cl.[2] D01H *15/00, 13/14*

U.S. Cl. 57—263 **9 Claims**



1. Open-end spinning machine apparatus comprising:

a plurality of spinning assemblies disposed adjacent one another,

and a mobile servicing device which is movable to respective servicing positions adjacent respective ones of said spinning assemblies, said mobile servicing device including a servicing instrument engageable with a structural part of a spinning assembly during servicing operations,

wherein said servicing instrument is provided with an aligning element which is positioned in a predetermined position with respect to said servicing instrument,

wherein at least one of said spinning assemblies is provided with a guide element, said guide element being adjustably positioned in a predetermined position with respect to said structural parts,

wherein said aligning element of said servicing instrument is engageable with said guide elements at said spinning assembly to assure precise positioning of said servicing instrument with respect to said structural parts during servicing operations,

and wherein said servicing instrument is movable with respect to said mobile servicing device, and wherein said aligning element is connected to and carried with said servicing instrument.

4,173,115

YARN FORMING APPARATUS WITH NODE WELDING

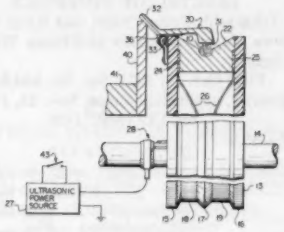
Phillip W. Chambley, and Alan H. Norris, both of Rome, Ga., assignors to WWG Industries, Inc., Rome, Ga.

Continuation-in-part of Ser. No. 755,671, Dec. 30, 1976, Pat. No. 4,074,511. This application Feb. 6, 1978, Ser. No. 875,423

The portion of the term of this patent subsequent to Feb. 21, 1995, has been disclaimed.

Int. Cl.[2] H01B *13/04;* **D02G** *3/26*

U.S. Cl. 57—293 **8 Claims**



1. An improved apparatus for joining synthetic yarn strands in a machine of the type having means for forming at least two singles yarn strands, means for twisting each of said strands individually to form false-twisted strands, each having longitudinally spaced nodes at which the direction of twist reverses, rotatable guide means having a central axis for guiding and carrying said strands into spaced substantially parallel paths with the nodes of said strands substantially aligned with each other, means at a predetermined location on said guide means for bringing the nodes of said strands into contact with each other, and means for joining said strands to each other at the nodes, the improvement wherein said means for joining comprises

heating means for elevating the temperature of said yarn strand nodes to a temperature substantially at the softening point thereof whereby said nodes are welded to each other.

4,173,116

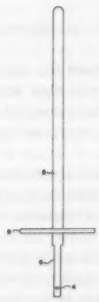
BULKY YARN SPINDLE FOR SPINNING WHEELS

Nell Schilder, 171 Grandview Rd., Ottawa, Ontario, Canada (K2H 8B9)

Filed Jun. 27, 1974, Ser. No. 483,551

Int. Cl.[2] D01H *3/00, 7/04*

U.S. Cl. 57—316 **2 Claims**



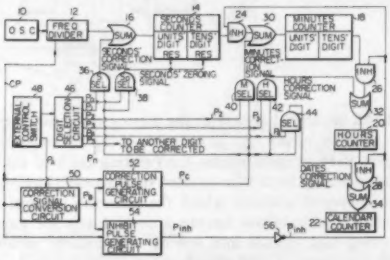
1. A spinning wheel comprising a first spindle for a flyer and a bobbin, said first spindle having a first orifice in its end and a second orifice along its length for guiding yarns to the flyer and the bobbin, a second detachable spindle having an end portion adapted to be fitted into and locked in the first orifice in the first spindle whereby the spinning wheel may alterna-

tively be used to spin yarns using the first spindle with the flyer and bobbin or using the second spindle inserted into the end of the first spindle.

4,173,117
ELECTRONIC TIMEPIECE

Kazutoshi Takahashi; Tatsuo Nitta, and Ryoji Iwakura, all of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1977, Ser. No. 844,866
Claims priority, application Japan, Nov. 25, 1976, 51/141417
Int. Cl.[2] G04C *3/00*
U.S. Cl. 58—85.5 **5 Claims**



1. In an electronic timepiece having a frequency standard providing an output frequency signal, a frequency converter responsive to said output frequency signal to provide a low frequency time unit signal and a clock signal, a time counter composed of a plurality of counter circuits responsive to the time unit signal to provide time information signals, display means for providing a display of time information in response to said time information signals, correction gate means coupled to each of said counter circuits for applying correction pulses and a carry signal from a previous stage counter circuit to a succeeding counter circuit to which said correction gate means is coupled, and inhibiting gate means coupled to each of said counter circuits and responsive to a carry inhibiting signal to inhibit carry operation due to said carry signal arising from said correction pulses, the improvement comprising:

a correction switch for producing a correction signal when actuated;

a digit selection switch for producing a digit selection signal when actuated;

digit selection circuit means for selecting a digit to be corrected in response to said digit selection signal;

means for producing an output signal having a first predetermined pulse width in response to said correction signal and said clock signal;

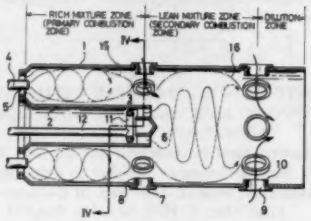
means for generating said correction pulses of a predetermined second pulse width narrower than said first predetermined pulse width in response to said output signal and said clock signal; and

means for producing said carry inhibiting signal of a third predetermined pulse width narrower than said first predetermined pulse width but larger than said second predetermined pulse width, said carry inhibiting signal producing means including a single differentiating circuit having its clock input terminal connected to said frequency converter to receive said clock signal and its data input terminal connected to receive said output signal to produce said carry inhibiting signal composed of a differentiation pulse of said third predetermined frequency.

4,173,118
FUEL COMBUSTION APPARATUS EMPLOYING STAGED COMBUSTION

Katsuyuki Kawaguchi, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 606,794, Aug. 22, 1975, abandoned.
This application Aug. 31, 1977, Ser. No. 829,240
Claims priority, application Japan, Aug. 27, 1974, 49-97517; Aug. 27, 1974, 49-97518; Dec. 3, 1974, 49-137709
Int. Cl.[2] F02C *7/22*
U.S. Cl. 60—39.65 **7 Claims**



1. Fuel combustion apparatus comprising a double concentric combustion cylinder having an outer cylinder and an inner cylinder concentric with, and shorter than the outer one, said inner cylinder being located in the upstream portion of the space within the outer cylinder and extending axially to form an annular space therebetween, a plurality of fuel injection valves installed in a circular arrangement at the head of said annular space, primary combustion air swirlers mounted around each of the fuel injection valves, a secondary combustion air swirler installed at the inner end of the inner cylinder, a first set of air holes annularly disposed in the wall of the outer cylinder in a common plane comprising the outler plane of th inner cylinder and a second set of air holes annularly disposed in the wall of the outer cylinder in a common plane at an axial distance not less than the diameter of the outer cylinder downstream from the said first air holes, both said inner and outer cylinders being imperforate between the head ends thereof and the first set of air holes, and between the first and second sets of air holes thereby defining a primary burning zone in the annular space between said head end and said first set of air holes and a secondary burning zone axially adjacent and downstream thereof between said first and second sets of air holes, said fuel injection valves and primary combustion air swirlers supplying an air-fuel rich mixture to said primary burning zone for combustion therein and said first set of air holes introducing sufficient secondary air to the uncombusted exhaust from said primary zone to provide an air-fuel lean mixture in said secondary burning zone for combustion therein.

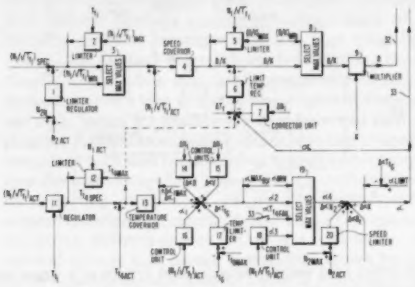
4,173,119
CONTROL SYSTEM FOR A GAS TURBINE ENGINE, ESPECIALLY A VEHICULAR GAS TURBINE ENGINE

Christian Greune, Furstenfeldbruck, and Friedrich Hackl, Neu-Esting, both of Fed. Rep. of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Filed Aug. 23, 1973, Ser. No. 390,844
Claims priority, application Fed. Rep. of Germany, Aug. 23, 1972, 2241363
Int. Cl.[2] F02C *7/02, 9/02, 9/08*
U.S. Cl. 60—39.16 R **70 Claims**

1. Control system for a gas turbine engine, especially for a vehicular gas turbine engine, having a gas generator means including a combustion air compressor and a gas turbine on a common gas generator shaft, a combustion chamber, and a free power turbine, variable guide vanes being arranged at the inlet of said free power turbine, the control system including speed governor means responsive to a controlled variable which is the speed N_1 of the gas generator shaft for providing an output

signal for controlling fuel flow to the engine, and temperature governor means responsive to a controlled variable which is a gas temperature T of the gas generator means for providing an output signal for controlling the positioning of the guide vanes, and varying means responsive to engine characteristics for varying the controlled variables and the output signals of said speed governor means and said temperature governor means as a function of engine characteristics, said varying means varying the controlled variable N_1 in accordance with the input temperature T_{f1} of the engine and varying the controlled variable T in accordance with the input temperature T_{f1} and the speed N_1 of the gas generator shaft, said varying means varying the output signal of said speed governor means in accordance with the input temperature T_{f1} of the engine, one of the gas turbine inlet temperature T_{f3} and outlet temperature T_{f4} of the gas generator means, and a multiplier K representing at least one characteristic of the engine, and said varying means varying the output signal of said temperature governor means in accordance with the difference between the specified speed N_{1spec} and the actual speed N_{1act} of the gas generator shaft.

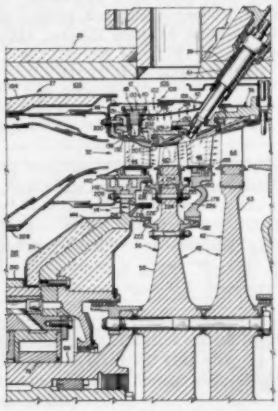


4,173,120

TURBINE NOZZLE AND ROTOR COOLING SYSTEMS

William C. Grosjean, Poway, and John J. Hensley, Delmar, both of Calif., assignors to International Harvester Company, Chicago, Ill.

Filed Sep. 9, 1977, Ser. No. 831,961
Int. Cl.[2] F02C *3/10*; E01D *25/14*
U.S. Cl. 60—39.16 R **13 Claims**



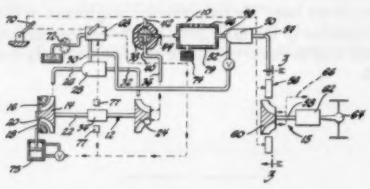
1. A gas turbine comprising: a nozzle case through which heated gases are adapted to flow to drive a turbine rotor rotatably supported in said case; a housing surrounding said case in spaced relation thereto; first and second stage, flow directing nozzles supported in longitudinally spaced relationship from said case; and means for cooling said nozzles and said case comprising means for directing a first stream of air directly from the space between said housing and said case to the interiors of the nozzles in one of said stages, means in the space between said housing and said case and surrounding the latter for directing a second, separate stream of air from said space into impinging relationship with said case in the span between said nozzle stages around the periphery of said case, and means for then directing said second stream of air into the interiors of the nozzles in the other of said stages.

4,173,121

HYBRID DUAL SHAFT GAS TURBINE WITH ACCUMULATOR

Mason K. Yu, Birmingham, Mich., assignor to American Standard, Inc., New York, N.Y.

Filed May 19, 1978, Ser. No. 907,894
Int. Cl.[2] F02C *3/10*
U.S. Cl. 60—39.16 R **3 Claims**

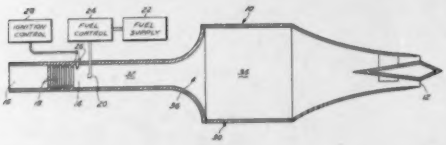


1. An automotive gas turbine engine comprising: a gasifier spool having a compressor on one end thereof and a gasifier turbine on the opposite end thereof, means including a variable area inlet for controlling air flow to said compressor during operation of said gasifier spool, a power turbine, a primary burner receiving air from said compressor and operative to produce motive fluid for driving said gasifier turbine, means including a thermally insulated accumulator and a secondary burner to receive exhaust flow from said gasifier turbine, means including a variable area nozzle to control flow from said accumulator and said secondary burner to said power turbine, control means operative on engine start to open said variable area inlet and to direct fuel to said primary burner until the gasifier turbine increases its speed to produce a predetermined charge pressure in said accumulator, said control means including a pressure sensor operative following attainment of said predetermined charge pressure to close said inlet and cut back fuel flow to a predetermined idle fuel flow level in said primary burner, said idle fuel flow level to said primary combustor being selected to maintain said gasifier spool at eighty-five to ninety-five percent of its full design speed, said control means including a manual operator concurrently controlling said variable area nozzle to direct a controlled amount of motive fluid from said accumulator to said power turbine to meet the vehicle power requirements, said control means further being operative to control fuel flow to said secondary burner to maintain a desired power turbine inlet temperature schedule to meet the driver demanded vehicle output power, and said pressure sensor detecting the pressure level in said accumulator during road operation and operative when the pressure level in said accumulator falls below the maximum predetermined charge pressure to open said variable area inlet and to add fuel to said primary burner whereby the gasifier spool will accelerate to recharge the accumulator to maintain the maximum predetermined pressure level therein whereby optimized gasifier section fuel consumption is attained and increased power turbine pressure ratios are maintained.

4,173,122
INTERMITTENT BURNING JET ENGINE

David B. Wilkinson, Xenia, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 9, 1978, Ser. No. 876,442
Int. Cl.[2] F02K 7/02
U.S. Cl. 60—247 3 Claims

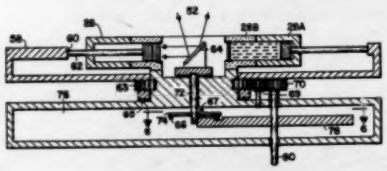


1. An intermittent burning ramjet engine comprising: an elongated tubular member including an inlet diffuser at one end, adapted to receive ram inlet air, and an exit nozzle at the other end; a rough wall combustor within said elongated tubular member; means for supplying fuel to said combustor; means for cyclically igniting said fuel in said combustor, at a predetermined frequency; means, positioned between said combustor and said ram air inlet, for reducing the magnitude of the pressure fluctuations in the inlet diffuser, due to the cyclical ignition of the fuel in the combustion chamber, by a factor of at least 100.

4,173,123
OPTICALLY DRIVEN SOLAR ENGINE

Richard W. Gurtler, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 705,842, Jul. 16, 1976, abandoned. This application Jul. 8, 1977, Ser. No. 814,232
Int. Cl.[2] F03G 7/02
U.S. Cl. 60—641 4 Claims



1. An optically driven solar engine, comprising:

(a) a plurality of elements which convert solar energy to mechanical motion, each of said elements comprising a cylinder, a piston operatively disposed in said cylinder, and a thermally expandable fluid in said cylinder, said cylinder having a transparent head which allows solar energy to be transmitted into said cylinder;

(b) means for focusing the sun's rays;

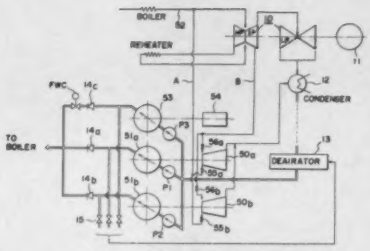
(c) a reflective surface, movable to selectively reflect said focused rays into said cylinders; and

(d) fluid flow passages interconnecting said cylinders, said passages capable of transmitting said thermally expandable fluid from one of said cylinders to another of said cylinders.

4,173,124
BOILER FEED WATER PUMP CONTROL SYSTEMS

Katsumasa Fujii, Tokyo, and Naoshi Takeda, Fuchu, both of Japan, assignors to Tokyo Shibaura Kenki Kabushiki Kaisha, Kanagawa, Japan

Filed Feb. 7, 1978, Ser. No. 875,896
Claims priority, application Japan, Feb. 8, 1977, 52-12843
Int. Cl.[2] F01K 13/02
U.S. Cl. 60—667 5 Claims

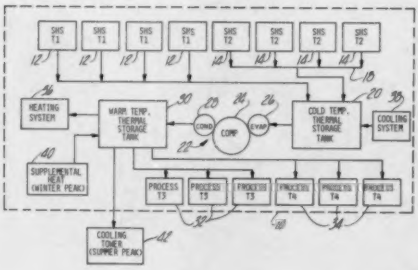


1. A boiler feed water pump control system of a steam electric power generating plant provided with a boiler, a steam turbine driven by the steam generated by said boiler, a generator driven by said steam turbine, and a feed water system of said boiler including a motor driven feed water pump provided with a flow control valve and a steam turbine driven feed water pump, said control system comprising a digital computer including a flow quantity control system responsive to the degree of opening of said flow control valve and discharge quantity of said motor driven feed water pump for controlling the flow quantity thereof, a speed control system responsive to the number of revolutions and discharge flow quantity of said steam turbine driven feed water pump, system head pressure of said feed water system and the operation of a control motor which is used to control steam supplied to a steam turbine for driving said steam turbine driven feed water pump, and means responsive to the load of said power plant for effecting transfer between said flow quantity control system and said speed control system.

4,173,125
ENERGY RECOVERY SYSTEM

Norman F. Bradshaw, Richmond, England, assignor to Schweitzer Industrial Corporation, Madison Heights, Mich.

Filed Mar. 16, 1978, Ser. No. 887,156
Int. Cl.[2] F25B 7/00, 27/02
U.S. Cl. 62—79 20 Claims



1. An energy recovery system for collecting and utilizing heat energy dissipated from a plurality of relatively low, different temperature secondary heat sources in an industrial plant or other installation, the system comprising:

heat pump means including a refrigeration unit consisting of

an evaporator, a condenser, and means for condensing said refrigerant in said condenser, and vaporizing said refrigerant in said evaporator, whereby heat energy is transferred from said evaporator into said condenser;

collection heat transfer means associated with each of said secondary waste heat sources causing transfer of heat from said secondary heat sources into said evaporator of said heat pump means, comprising: a plurality of heat exchanger means, one each associated with each of said secondary heat sources and means for transferring heat from said secondary heat sources into said respective associated heat exchanger means and further including a heat transfer medium circulated through each of said plurality of heat exchanger means; a cool temperature thermal storage tank means; means for collecting the heat transfer medium flow circulated through each of said heat exchanger means into said cool temperature thermal storage tank; means for transferring heat from said cool temperature thermal storage tank means into said evaporator associated with said heat pump means, said cool temperature thermal storage tank means further including means for collecting quantities of heat transfer media flow from respective different temperature secondary heat sources in respective different spaces within said cool temperature thermal storage tank means; segregation means for separately maintaining heat transfer media of differing temperatures in said respective different spaces preventing intermixing thereof and maintaining the maximum thermal energy of said heat transfer media received from said plurality of heat exchanger means associated with each of said secondary heat sources;

at least one heat using process device;

process utilization heat transfer means causing heat transfer from said condenser of said heat pump means to at least one heat utilizing process device;

whereby said heat transfer from said relatively low temperature heat sources into said evaporator and said transfer by said heat pump into said condenser enables said utilization of said heat in said at least one heat utilizing process device.

19. A method of recovering heat energy from a plurality of different temperature secondary heat sources located in varying locations within an industrial plant or similar installation, the method comprising the steps of:

transferring heat from each of said secondary heat sources to the evaporator of a heat pump unit including the steps of: circulating a heat transfer medium through a heat exchanger means associated with each of said secondary heat sources; collecting quantities of said heat transfer media in a common thermal storage tank received from respective different flows from each of said heat exchangers at varying locations in said common thermal storage tank; segregating the respective differing temperature quantities of collected heat transfer media from each other;

transferring heat rejected in the condenser of said heat pump unit to heat using process devices, whereby the heat energy may be recovered from said secondary heat source at relatively low different temperatures and utilized at relatively high temperatures by operation of said heat pump unit.

4,173,126

MACHINE FOR THE CONTINUOUS PRODUCTION OF WHIPPED CREAM

Emanuele Romano, Chiasso, Switzerland, assignor to Wetrifin A.G., Mauren, Italy

Filed Oct. 17, 1977, Ser. No. 842,805

Claims priority, application Italy, Oct. 15, 1976, 28401 A/76

Int. Cl.[2] **B01F** *3/04*

U.S. Cl. 62—306 **8 Claims**

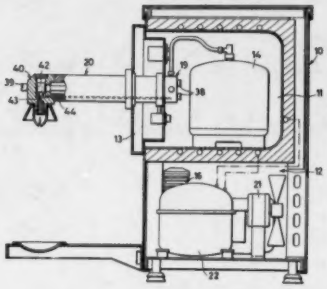
1. A machine for the continuous production of whipped cream during a given time period, comprising:

a cabinet a refrigerating cell disposed in a top portion of said cabinet and including a bottom compartment

a tank containing a food mixture disposed in said cell

a door mounted on said cabinet so as to close said cell

a texturizer mounted on said door



piping members interconnecting said tank and said texturizer

means for feeding a gas under pressure disposed in said bottom compartment of said cell, and

a motor and compressor unit disposed in said bottom compartment forming a refrigerating loop of said cell.

4,173,127

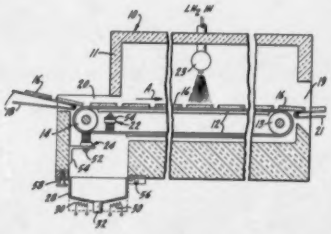
FROST REMOVAL APPARATUS FOR CRYOGENIC FREEZING TUNNEL

Glenn A. Sandberg, Lockport, Ill., assignor to Formax, Inc., Mokena, Ill.

Filed Nov. 2, 1977, Ser. No. 847,720

Int. Cl.[2] **F25D** *3/10, 25/04*

U.S. Cl. 62—374 **4 Claims**



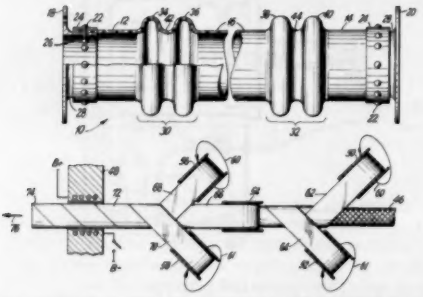
1. Frost removal apparatus for a cryogenic freezing tunnel of the kind in which comestibles, delivered from an outside source, are frozen by contact with a fluid cryogen introduced into the tunnel, a conveyor of open-mesh endless belt form inside the tunnel presenting a reverse turn where the path of the conveyor belt reverses from a lower pass in one direction to an upper pass in the opposite direction, an input opening in one wall of the tunnel through which the comestibles are fed and deposited on the conveyor, the frost removal apparatus comprising a brush engaging the conveyor in its lower pass for brushing accumulated frost from the interstices of the conveyor, a pan to collect the frost brushed from the conveyor, and a heater means to melt the collected frost in the pan.

4,173,128

COMPOSITE DRIVE SHAFT

Nicholas Corvelli, Smithtown, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 23, 1978, Ser. No. 908,742
Int. Cl.[2] F16C *1/00*
U.S. Cl. 64—1 S **14 Claims**



1. A compliant composite drive shaft of a symmetrical lamination comprising:

a tubular length having bellows adjacent each end inwardly of connection means for the shaft to be used between driving and driven devices said tubular length and bellows having:

an inner layer of a first continuous filament reinforced tape, said inner layer including several of said tapes layed in alternating acute angles to the axis of the shaft;

an intermediate layer of a second continuous filament reinforced tape including at least one such tape layed along the longitudinal axis of the shaft about said inner layer; and

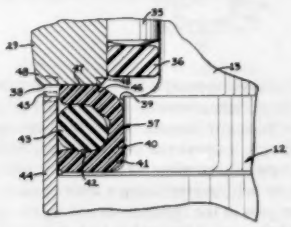
an outer layer of said first continuous filament reinforced tape, said outer layer including several of said tapes layed in alternating acute angles to the axis of the shaft, which acute angles are a repeat of that of said tapes of said inner layer providing integrated inner, intermediate and outer layers throughout the tubular length including the bellows adjacent each end that is symmetrical about the shaft axis such that said bellows provide an integrated universal for said shaft within the extremities and adjacent the ends of the drive shaft.

4,173,129

UNIVERSAL JOINT STRUCTURE WITH IMPROVED SEAL

Donald F. Durham, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 13, 1978, Ser. No. 895,889
Int. Cl.[2] F16D *3/26*
U.S. Cl. 64—17 A **13 Claims**



1. In a universal joint structure having a yoke carrying first and second inwardly opposed coaxial bearing caps defining inner annular end surfaces, and a member having first and second outwardly opposed coaxial trunnions journaled respectively in said first and second bearing caps, said trunnions having a preselected axial play in said bearing caps, the improvement comprising:

means on said member and said bearing caps cooperatively defining a first annular seal space adjacent said first bearing cap and a second seal space coaxial of said trunnions adjacent said second bearing cap;

a first annular seal ring in said first seal space having a C-shaped cross section opening away from the axis of said trunnions, one radially extending leg of the seal ring being juxtaposed to the annular end surface of said first bearing cap with a force of approximately 30 to 70 pounds;

a first annular load ring compressed within said C-shaped seal ring and urging said one leg of the seal ring sealingly against said annular end surface of said first bearing cap;

a second annular seal ring in said second seal space having a C-shaped cross section opening away from the axis of said trunnions, one radially extending leg of said second seal ring being juxtaposed to the annular end surface of said first bearing cap;

a second annular load ring compressed within said second C-shaped seal ring and urging said one leg of the second seal ring sealingly against said annular end surface of said second bearing cap with a force of approximately 30 to 70 pounds; and

retainer means for loading said load rings to cause the radially extending legs to be sealingly engaged with said end surfaces and the seals to be sealingly engaged with said member inwardly of said trunnions over the entire range of axial play movement of said trunnions in said bearing caps, thereby to define an effective oil seal between said member and bearing caps.

4,173,130

DRILLING SHOCK SUB

Wayne N. Sutliff, and Jim L. Downen, both of 2931 Pierce Rd., Bakersfield, Calif. 93308

Filed Jan. 31, 1978, Ser. No. 874,035
Int. Cl.[2] F16D *3/06;* F16F *9/30, 9/06*
U.S. Cl. 64—23 **1 Claim**

1. In a well drill string shock sub, the combination of:

inner and outer axially telescopically related tubular elements;

spline means transmitting torque between said elements;

means for connecting one of said elements to a drill bit;

means for connecting the other of said elements to a drill string assembly;

at least one pair of opposed shoulders being provided on said elements to set a limit to expansive telescopic movement between said elements;

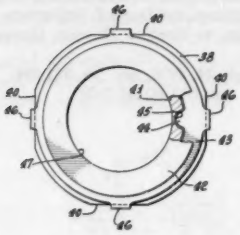
overlapping portions respectively of said elements being comparatively thin walled to provide an annular hydraulic cushion confining chamber closed by annular sliding seals at its opposite ends;

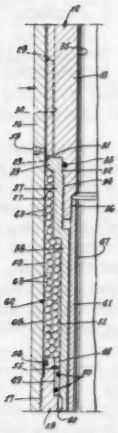
a semi-hydraulic elastically compressible cushion confined in and filling said chamber to produce normally the telescopic expansion of the tool to its maximum length, the dispersed phase of said cushion comprising a well packed body of polyurethane pellets the continuous phase of said cushion comprising a body of engine lubricating oil of the order of Mobil No. 1;

the thin walled overlappiing portion of said inner element referred to as the outer wash pipe being secured by right hand female threads to right hand male threads of an adjoining thick walled portion of said inner element, said thick walled portion of said inner element being counter bored at one end and at the same end thereof being provided with left hand female threads;

a left hand threaded inner wash pipe fitting within said

counter bore and screwing into the female left hand threads thereof; and





tang washer means for interlocking outer ends of said outer and inner wash pipes to assure against either becoming accidentally unscrewed.

4,173,131

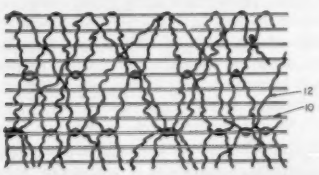
POROUS ELASTIC BANDAGE

John E. Pendergrass, Seneca, and David T. Melton, Walhalla, both of S.C., assignors to The Kendall Co., Walpole, Mass.

Continuation-in-part of Ser. No. 917,267, Jun. 20, 1978, abandoned, which is a continuation of Ser. No. 829,130, Aug. 30, 1977, abandoned, said Ser. No. 829,130, is a continuation-in-part of Ser. No. 746,360, Dec. 1, 1976, abandoned. This application Nov. 15, 1978, Ser. No. 960,906

Int. Cl.[2] D04B *7/12, 9/12;* **A61L** *15/00*

U.S. Cl. 66—192 **6 Claims**



1. A self-supporting, open mesh knitted elastic bandage characterized by the tendency of overlapping layers of the bandage to cling to each other in relatively non-displaceable relationship, which comprises

a set of composite parallel warp yarns comprising a first false-twist yarn formed into stitch loop chains with a second false-twist yarn inlaid into the loops of said first false-twist yarn,

said second false-twist yarn being of opposite twist from the twist of said first false-twist yarn,

and a plurality of individual filling yarns describing varied and cursive patterns across said set of composite warp yarns and being inlaid therewith,

said varied and cursive patterns of filling yarns overlapping one with another across a substantial portion of the width of said bandage,

no individual filling yarn pattern extending across more than a minor portion of the width of said bandage,

and a portion at least of the length of said filling yarns lying in slack looped configuration on the surface of said bandage.

4,173,132

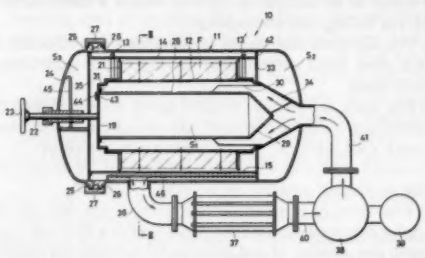
DYEING APPARATUS

Isao Sugimoto, Aichi, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Chiyoda and Nippon Dyeing Machine Mfg. Co., Ltd., Aichi, both of, Japan

Filed May 24, 1978, Ser. No. 909,123

Int. Cl.[2] D06B *5/18*

U.S. Cl. 68—189 **6 Claims**

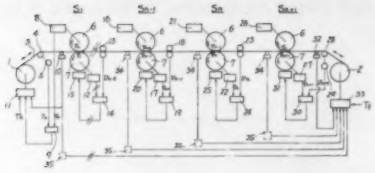


1. A dyeing apparatus which comprises a cylindrical vessel of generally circular cross-section extending longitudinally along a generally horizontal axis, said vessel having an outer wall; means defining a perforated hollow beam supported within said vessel and extending longitudinally along said axis; said beam being capable to support material to be dyed wound upon the exterior of the beam, the perforations of said beam allowing dye liquid to flow into and through such material; an elongated dummy cylinder positioned within the hollow portion of the beam to define therewith an annular flow passage for the dye liquid; a non-perforated elongated cylindrical shell supported within said vessel and interposed in laterally surrounding relation to said beam and material supported thereby, said shell being spaced-apart in relation to said outer wall of the vessel to define with said outer wall a first circumferential chamber, said shell defining a boundary of a second circumferential chamber confining dye liquid passed from said annular flow passage through the perforations of the beam and said material, said shell having at its upper portion an opening that permits overflow of dye liquid from said second circumferential chamber into said first circumferential chamber; means flow connected with said annular flow passage to introduce therein dye liquid; and means flow connected with said first circumferential chamber for the outflow therefrom of overflow dye liquid collected therein.

4,173,133
CONTINUOUS ROLLING MILL

Isao Imai, Yokohama, and Hiroyuki Shiozaki, Yokosuka, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1978, Ser. No. 880,935
Claims priority, application Japan, Feb. 28, 1977, 52-21344
Int. Cl.[2] B21B *37/06*
U.S. Cl. 72—8 1 Claim



1. A rolling mill wherein a part of upper and lower work rolls are rotated at different peripheral velocities in order to maintain the peripheral velocity ratio of the work rolls substantially equal to an elongation ratio at which a sheet metal is rolled, the rolling mill comprising:

(a) velocity detecting means for detecting the velocities of the sheet metal entering and leaving one or each rolling mill stand;

(b) first work roll velocity control means for controlling the peripheral velocity of one of said pair of upper and lower work rolls which is rotated slower than the other;

(c) second work roll velocity control means for controlling the peripheral velocity of the other work roll;

(d) first velocity comparison means for comparing the peripheral velocity of said one work roll of a first mill stand with the velocity of said sheet metal entering the stand to generate a first correction signal representative of the difference between the entering sheet metal velocity and the one work roll peripheral velocity when there exists a difference therebetween, and first sheet metal tension control means responsive to said first correction signal for correcting the tension of the sheet metal entering the first mill stand, whereby the velocity of said sheet metal entering the first mill stand may be maintained substantially equal to the peripheral velocity of said one work roll of the stand;

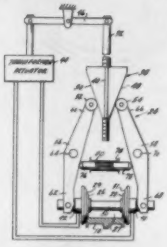
(e) second velocity comparison means for comparing the peripheral velocity of said the other work roll with the velocity of said sheet metal leaving the rolling mill stand to generate a second correction signal representative of the difference between the leaving sheet metal velocity and the other work roll peripheral velocity when there exists a difference therebetween, and second sheet metal tension control means responsive to said second tension correction signal for correcting the tension of the sheet metal leaving the rolling stand, whereby the velocity of said sheet metal leaving the rolling mill stand may be maintained substantially equal to the peripheral velocity of said other work roll of the rolling mill stand; and

(f) third sheet metal tension control means for controlling a recoiler so that the tension of the sheet metal leaving a last rolling mill stand may be maintained at a predetermined value.

4,173,134
APPARATUS AND METHOD FOR GUIDING A RING STRUCTURE DURING THE MANUFACTURE THEREOF

Niilo T. Huuskonen, Salem, and Dante P. DiBattista, Lynn, both of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Feb. 24, 1978, Ser. No. 881,096
Int. Cl.[2] B21H *1/06*
U.S. Cl. 72—10 17 Claims



1. For use in a method of manufacturing a metal ring to a desired contour and radial diameter the steps comprising:

providing an initial metal ring having an initial axial width;

rolling the initial ring about a first axis of rotation and between selected pairs of roll forming dies so as to progressively vary the axial width of said ring from said initial axial width to a second axial width;

providing a pair of axially spaced-apart guide members disposed adjacent to said ring and adapted to maintain said ring in a predetermined location with respect to said roll forming dies;

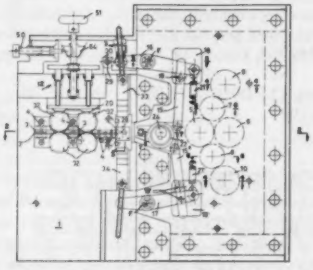
providing sensing means for sensing variations in said axial width of said ring; and

varying the axial spacing between said spaced-apart guide members in response to said sensing means.

4,173,135
MACHINE FOR COILING METAL WIRE

Enrico Lamperti, Via Ercole Ferrario 4, Gallarate (Varise), Italy

Filed Apr. 12, 1977, Ser. No. 786,791
Claims priority, application Italy, Apr. 12, 1976, 83614 A/76
Int. Cl.[2] B21F *3/02, 11/00*
U.S. Cl. 72—21 3 Claims



1. An automatic machine for coiling metal wires to form springs, comprising power driven means (**40**, **32**) to advance wire to be coiled, means (**36**) to coil the advanced wire, a pair of slides (**33**, **34**) disposed on opposite sides of the path of advance of the wire, a retractor (**70**) detachably mounted on one of said slides (**33**, **34**) for opening a coiled wire, a cutter (**65**) detachably mounted on the other of said slides (**33**, **34**) for severing a length of coiled wire, said cutter (**65**) and retractor (**70**) being adapted to be interchangeably mounted on either of

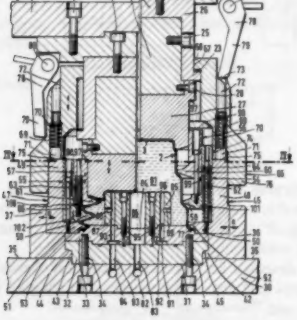
said slides (33, 34), a first power-driven shaft (24) having means (22) for imparting to either of said slides a wire cutting movement, a second power-driven shaft (23) having means (25) to impart to either of said slides a coil retracting movement, and means (15, 15', 16, 17) for selectively interchangeably interconnecting either of said shafts (23, 24) with either of said slides (33, 34) thereby selectively to adapt said machine to the formation of right-hand coils or left-hand coils.

4,173,136

METHOD AND APPARATUS FOR PRODUCING MULTIPLE GROOVE V-BELT PULLEYS

Wilhelm H. Schroth, Ringstrasse 12, D-6053 Obertshausen, Fed. Rep. of Germany

Filed Nov. 17, 1977, Ser. No. 852,563
Int. Cl.[2] B21D *26/04*
U.S. Cl. 72—58 19 Claims



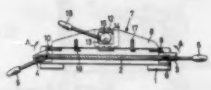
1. A method for producing a multiple groove V-belt pulley from sheet metal during a shaping operation to form the multiple groove V-belt pulley by cold-working a prefabricated cup-shaped blank having at least one cylindrical portion and axially displaceable segmental shaping parts which form shaping rings to embrace said blank comprising moving said shaping parts radially up to the blank at axially spaced precisely predetermined positions to form and shaping rings, moving a sleeve-like retaining member over the shaping parts of a first one of said shaping rings so that the shaping parts cannot move radially outward during the shaping operation, producing controlled fluid pressure within the cup-shaped blank to engage the walls of the cup-shaped blank firmly against the shaping parts along spaced peripheral lines, axially compressing said cup-shaped blank while the other of said shaping rings are independently movable in an axial direction from an initial position at the start of the operation to a final position at the end of the operation without being subject to axial pressure from any other part moving said other shaping rings together to simultaneously form the grooves in the pulley, moving said sleeve-like retaining member from around the shaping parts of said first one of said shaping rings and moving said shaping parts radially outward away from the shaped pulley.

4,173,137

BENDING FIXTURE FOR OFFSET PLATES

Heinz Metje, Mittelstrasse 21, 5630 Leichlingen, Fed. Rep. of Germany

Filed Jun. 23, 1977, Ser. No. 809,429
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1976, 2628249
Int. Cl.[2] B21D *25/04, 5/04*
U.S. Cl. 72—320 9 Claims



1. A bending fixture for offset plates provided with positioning holes, said bending fixture comprising:

a platform having a flat horizontal upper surface for supporting an offset plate;

a first bending bar being disposed at one end of said platform;

a second bending bar being disposed at an opposite end of said platform;

means for pivotally mounting said first and second bending bars relative to said platform for swinging said first and second bending bars upwardly from their rest positions at the opposite ends of said platform to their bending positions above said platform;

retractable pin means disposed in said first bending bar in a bending area of the plate for positioning the plate on said platform, said retractable pin means including pins disposed in a direction along a length of said first bending bar, said pins being disposed in front of said one end of said platform and extending outwardly in an upward direction from an upper surface of said first bending bar when said first bending bar is in its rest position;

hold-down means for holding down the plate on said platform;

means for raising and lowering said hold-down means relative to said upper surface of said platform;

said hold-down means including positioning rail members, a first of said rail members being disposed at said one end of said platform for cooperating with said first bending bar and a second of said rail members being disposed at said opposite end of said platform for cooperating with said second bending bar; and

said first and second rail members providing back up abutments for bent over edges of the plate.

4,173,138

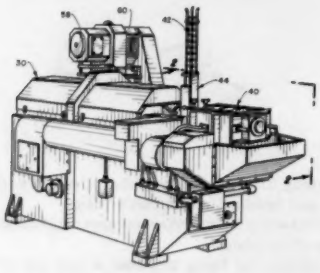
CAN BODYMAKER HAVING IMPROVED RAM SUPPORT AND DRIVE

Ralph M. Main, San Pedro, and Elpidifor Paramonoff, Los Angeles, both of Calif., assignors to Standun, Inc., Compton, Calif.

Filed Oct. 28, 1977, Ser. No. 846,420
Int. Cl.[2] B21D *22/28*
U.S. Cl. 72—349 18 Claims

1. In a can bodymaker and the like of the type having a drive mechanism operably connected to a rearward end of a horizontally reciprocal ram axially moving the ram forwardly through and rearwardly through and from a die assembly, the ram in its forward movement engaging a shallow metal cup blank over a ram forward end and carrying the blank forwardly through the die assembly converting the blank into a relatively deep cup-shaped can body; the improvements comprising: axially spaced and aligned hydrostatic oil bearing sleeves secured stationary on said bodymaker rearwardly of said die assembly and circumferentially surrounding said ram,

said axially spaced bearing sleeves being between said die assembly and said drive mechanism connection to said ram rearward end in all positions of ram movement supporting said ram forward end movable in cantilever fashion projecting forwardly of said bearing sleeves progressively axially into and from said die assembly, said axially spaced bearing sleeves being the last effective alignment maintaining support of said ram forward end prior to entrance of said ram into and during



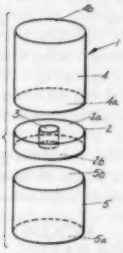
withdrawal from said die assembly, said bearing sleeves having oil bearing pads directing constantly pressurized and flowing oil films against said ram maintaining with said bearing sleeve spacing said ram supported aligned with said die assembly in all positions of ram movement including said ram cantilever projection and a majority of said ram isolated as to said support and alignment from a remainder of said bodymaker in all positions of ram movement.

4,173,139

ULTRASONIC REFERENCE STANDARD AND THE METHODS OF CONSTRUCTION AND USE THEREOF

Don L. Conn, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Apr. 21, 1978, Ser. No. 898,666
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—1 DV **11 Claims**



1. A reference standard for calibrating ultrasonic flaw detecting test equipment and the like comprising a substantially solid body having at least two spaced surfaces adapted to be engaged and abutted by the test equipment for introducing ultrasonic energy into said body from either surface, and at least one void of known dimensions totally enclosed within said body at a known distance from said surface, said void having two spaced substantially planar surfaces configured to reflect substantially all of the ultrasonic energy impinging on said planar surfaces toward the test equipment, the volume of said void being substantially less than the volume of said body.

10. The method for calibrating ultrasonic flaw detection test equipment and the like by introducing ultrasonic sound waves of known characteristics from the test equipment into a continuously rotating reference standard containing a void and receiving and interpreting waves reflected from said void comprising the steps of:

(a) rotatably supporting a substantially cylindrical reference standard having a void of known dimensions totally enclosed within the standard at a known distance from the surface of the standard, said void having two spaced substantially planar surfaces configured to reflect substantially all of the ultrasonic sound waves impinging on said planar surfaces toward the test equipment;

(b) continuously rotating the standard about its longitudinal axis;

(c) introducing ultrasonic sound waves of known characteristics from said test equipment into said standard; and

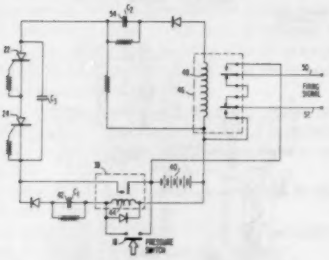
(d) receiving and interpreting waves reflected from said void to calibrate the test equipment.

4,173,140

TRIGGER DEVICE FOR EXPLOSION BARRIER

Israel Liebman, Library; Frank T. Duda, Oakdale, and Ronald S. Conti, Pittsburgh, all of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 3, 1978, Ser. No. 874,953
Int. Cl.[2] G08B *17/00*
U.S. Cl. 73—35 **8 Claims**



1. An apparatus for monitoring the conditions in an area where flammable materials can accumulate and providing a triggering signal when conditions indicative of an explosion are detected, comprising:

a pressure detector for detecting a sudden pressure increase in said area and providing an energizing signal in response thereto; and

first and second radiation detectors for monitoring said area for radiation in response to said energizing signal, said first and second radiation detectors being mounted in a common housing with their axes angularly spaced, said radiation detectors detecting radiation through a common aperture in said housing whereby said first and second radiation detectors monitor nonoverlapping portions of said area, said apparatus providing said triggering signal when both of said radiation detectors simultaneously detect an amount of radiation indicative of the presence of an explosion-related flame.

4,173,141

METHOD OF DETERMINING GAS LEAKAGE THROUGH A MINE STOPPING

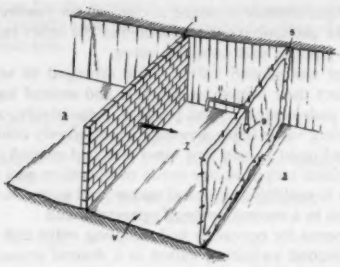
Fred N. Kissell, Pittsburgh; Slavoljub D. Maksimovic, Library, both of Pa., and Joseph E. Matta, Bel Air, Md., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 28, 1978, Ser. No. 964,416
Int. Cl.[2] G01M *3/20*
U.S. Cl. 73—40.7 **5 Claims**

1. A method for determining the gas leakage past a mine passageway stopping comprising the steps of:

(1) setting up a test gas barrier in the mine passageway

adjacent to the mine stopping to form a substantially closed gas test chamber therebetween;
(2) introducing a tracer gas into the test chamber;
(3) mixing said tracer gas with the ambient gas in the test chamber;



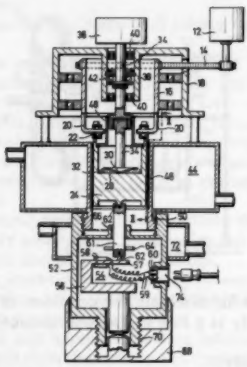
(4) periodically measuring the rate of change in concentration of said tracer gas in the chamber; and
(5) determining the gas leakage past said mine passageway stopping based upon the measured rate of changes in tracer gas concentrations.

4,173,142

ROTARY VISCOMETER

Werner Heinz, Dabringhauser Str. 72, D-5000 Köln-Dellbruck, Fed. Rep. of Germany

Filed Mar. 28, 1978, Ser. No. 891,138
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1977, 2733099
Int. Cl.² G01N *11/10*
U.S. Cl. 73—60 **10 Claims**



1. A rotary viscometer operating on the plate to cone or plate to plate principle constructed in the form of a first assembly comprising:
(1) a chamber containing a substance whose viscosity is to be measured,
(2) means for heating same,
(3) upper and lower, counter-rotating measuring surfaces within the chamber, and
(4) a torque measuring device for measuring the tangential force exerted on one of the said measuring surfaces,
and a second assembly, comprising:
(1) a housing,
(2) a releasable connection between the housing and the first assembly,
(3) a force measuring device located within the housing for measuring the force acting normal to one of the said measuring surfaces, and
(4) means for transmitting force from the measuring surface for which the normal force acting thereon is to be measured, to the said force measuring means.

4,173,143

FLUID FLOW MEASURING APPARATUS

Roy Venton-Walters, Steyning, England, assignor to Ricardo & Co., Engineers (1927) Limited, Shorham-by-Sea, England

Filed Aug. 10, 1978, Ser. No. 933,044
Claims priority, application United Kingdom, Aug. 11, 1977, 33782/77
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS **14 Claims**

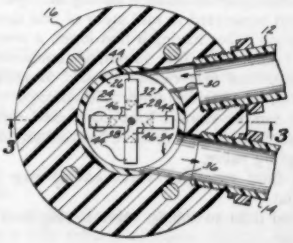
1. A fluid flow meter which comprises a flow duct through whose interior a fluid flow whose velocity to be measured can be passed, and a vortex-shedding bar positioned in the duct to extend across its interior transversely to the direction of fluid flow therein, means for sensing the passage of Karman vortices shed from the bar across a flow section close to the bar in the downstream direction said means producing an alternating output signal, and means for deriving from the output signal a modified output signal of square wave form suitable for operating a digital counter, wherein the improvement comprises at least one additional cross-member positioned in the duct to extend across its interior close to and down-stream of the said flow-section where the vortex-sensing means operates, the additional cross-member extending transversely to the vortex-shedding bar and having sufficient width, in the direction transverse to the flow direction, to cause the divergent parting of the fluid flow.

4,173,144

LOW FLOW RATE TRANSDUCER CONSTRUCTION

Edwin Pounder, La Canada, Calif., assignor to Transdynamics, Burbank, Calif.

Filed Apr. 3, 1978, Ser. No. 892,949
Int. Cl.² G01F *1/06*
U.S. Cl. 73—229 **8 Claims**



1. A fluid flow rate sensor construction comprising:
a housing having a cylindrical wall and opposite end walls defining a cylindrical fluid chamber;
inlet and outlet conduits extending tangentially through said cylindrical wall to define inlet and outlet ports, an imagi-

nary longitudinal extension of said inlet conduit into said fluid chamber defining an inlet stream tube;

a paddle wheel assembly rotatably mounted in said fluid chamber and including a hub and a plurality of paddle assemblies extending radially from said hub, each of said paddle assemblies comprising a paddle and strut means connecting said paddle to said hub in spaced relation to define an aperture between said paddle and said hub, each said paddle on rotation of said paddle wheel assembly successively assuming a stream tube position wherein said paddle intersects substantially all of said imaginary longitudinal extension of said inlet conduit, said aperture providing a passageway for fluid flow past said paddle thereby to prevent pulsating fluid flow through said outlet conduit;

a light source mounted in one of said end walls and spaced from the axis of rotation of said paddle wheel assembly; and

a photosensor mounted in the opposite one of said end walls for receiving light from said light source, the interruption of said light by said paddle assemblies initiating electrical signals indicative of the rate of rotation of said paddle wheel assembly.

4,173,145

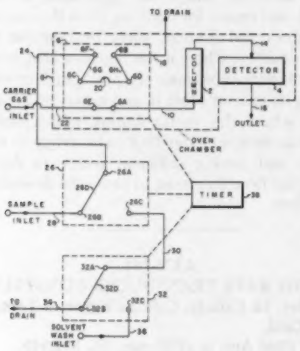
SOLVENT WASH SYSTEM FOR A CHROMATOGRAPHIC ANALYZER

Damien E. Durbin, Martin City, Tex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 8, 1977, Ser. No. 858,786

Int. Cl.[2] G01N *31/08*

U.S. Cl. 73—422 GC **8 Claims**



1. A chromatographic analyzer system comprising

a fluid flow detector having an input and an output,

a chromatographic column having an input and having an output connected to said input of said detector,

a sampling valve having a first input, a second input and a third input and a first output, a second output and a third output, said first output of said sampling valve being connected to said input of said column,

a fluid sample storage loop connected between said first input of said sampling valve and said second output of said sampling valve,

a first fluid switching valve having two inputs and one output,

a second fluid switching valve having two inputs and one output,

a fluid conduit arranged at one end for connection to a source of a sample fluid to be analyzed and connected at the other end to a first input of said first fluid switching valve,

a second fluid conduit connecting said output of said first switching to said second input of said sampling valve,

a third fluid conduit arranged at one end for connection to a continuous flow source of a wash solvent and connected at the other end to a second input of said second switching valve,

a fourth fluid conduit connecting said output of said second switching valve to a second input of said first switching valve,

a fifth fluid conduit arranged at one end for connection to a carrier gas source and connected at the other end to said third input of said sampling valve,

said first and second valves being arranged to selectively connect their output to said first and second inputs in a first and second valve position respectively, and said sampling valve being arranged to selectively connect said second input to said first input and said second output to said third output in one mode of operation and said first input to said third input and said second output to said first output in a second mode of operation, and

timer means for operating said sampling valve and said first and second switching valves in a desired sequence, said sequence selectively and concurrently operating said first and second switching valves between said first and second positions while said sampling valve is in said one mode of operation.

4,173,146

APPARATUS FOR BALANCING UNBALANCED BODIES

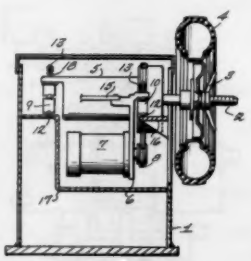
Horst Kögler, Dieburg, and Eickhart Goebel, Pfungstadt, both of Fed. Rep. of Germany, assignors to Gebr. Hofmann G.m.b.H. & Co. KG, Maschinenfabrik, Darmstadt, Fed. Rep. of Germany

Filed May 24, 1978, Ser. No. 909,060

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1977, 2732738

Int. Cl.[2] G01M *1/22*

U.S. Cl. 73—462 **2 Claims**



1. Apparatus for detecting the condition of balance of an unbalanced body in a first and second measuring plane comprising:

a pedestal body;

a mounting shaft having a front portion extending outward from said pedestal body for mounting an unbalanced body and a rear portion rotatably mounted in said pedestal body, along the longitudinal axis of said shaft;

a plurality of force detecting transducer means for horizontally supporting said mounting shaft and producing signals indicating imbalance when said unbalanced body is rotated;

further means for supporting said mounting shaft against movement in all other degrees of freedom;

wherein said plurality of force detecting transducer means, said further supporting means and the longitudinal axis of said mounting shaft are located in a single horizontal plane;

said plurality of force detecting transducer means includes at least three transducers, two of said at least three transducers being laterally arranged in said first plane of measurement adjacent to said mounting shaft; and another of said

at least three transducers being disposed in a second plane of measurement behind said rear portion of said mounting shaft centered along the line of the longitudinal axis of said mounting shaft; and

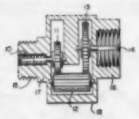
a housing which supports said transducers, and said pedestal body, said further supporting means comprising leaf springs fixedly mounted to said housing and said pedestal and laterally arranged in the horizontal plane of said longitudinal axis.

4,173,147

MILES TO KILOMETERS SPEED AND DISTANCE INDICATORS CONVERTER

Steve Zathy, 1709 Bloor W., Ste. 202, Toronto, Ontario, Canada (M6P 1B2)

Filed Dec. 19, 1977, Ser. No. 861,982
Int. Cl.² G01P *1/04*
U.S. Cl. 73—532 **1 Claim**



1. A converter to be connected between a vehicle transmission and a vehicle speedometer having a speedometer cable connected between the speedometer and the transmission by disconnectable couplings, the converter converting calibration of the speedometer between miles per hour and kilometers per hour, comprising:

a housing having an annular wall joining two opposed end walls;

a first spindle entering the housing through a first end wall and supporting a first gear near the end of the spindle inside the housing;

a second spindle entering the housing through the second end wall and supporting a second gear near the end of the spindle inside the housing, the first and second gears having different numbers of teeth in the ratio of miles to kilometers;

first and second coupling means outside the housing and respectively surrounding the spindles and cooperative to receive said disconnectable couplings;

an idler gear journaled in the housing between the end walls and offset from said spindles, the idler gear meshing with said first and second gears; and

a partition in said housing extending between the first and second gears from the annular wall opposite the idler gear toward the idler gear, the partition having bearing holes therein respectively located opposite said spindles and supporting the inner ends of the spindles.

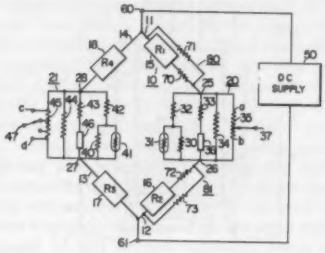
4,173,148

SEMICONDUCTOR STRAIN GAUGE WITH TEMPERATURE COMPENSATOR

Kazuji Yamada; Hideo Sato, both of Hitachi; Tsutomu Okayama; Motohisa Nishihara, both of Katsuta; Yoshitaka Matsuoka, Mito; Katsuya Katohgi, Hitachiota; Yasumasa Matsuda, and Satoshi Shimada, both of Hitachi, all of Japan, assignors to Hitachi, Ltd, Japan

Filed Oct. 5, 1978, Ser. No. 948,778
Claims priority, application Japan, Oct. 7, 1977, 52-119916
Int. Cl.² G01B *7/16*
U.S. Cl. 73—766 **7 Claims**

1. In a semiconductor strain gauge with a temperature compensator having a bridge circuit with four arms including semiconductor strain gauge elements to which pressure or strain is applied, said bridge circuit having input terminals for coupling a DC power suply with a pair of diagonally opposite junctions of said bridge circuit per se and output terminals for driving an output of said bridge circuit from a pair of remaining diagonally opposite junctions of said bridge circuit, initial zero-point temperature compensators each connecting in series and in parallel to each of semiconductor strain gauge elements on adjacent two arms of said bridge circuit and each comprising resistors for equalizing the resistance values and the temperature coefficients of all the semiconductor strain gauge elements when no pressure or strain is applied to the semiconductor strain gauge elements on the four arms, and a first temperature compensator for zero-point shift adjustment which is provided between the arms closer to one of the output terminals and is comprised of resistors for making the temperature coefficient of said first temperature compensator equal to that of the sensitivity of the semiconductor strain gauge element, the improvement wherein said first temperature compensator for zero-point shift adjustment is comprised of:



a first circuit including a temperature sensitive element with a positive primary temperature coefficient and a resistor connecting in series to the temperature sensitive element;

a second circuit including a parallel circuit including a thermistor and a resistor connecting in parallel to the thermistor and a resistor connecting in series to the parallel circuit;

a third circuit including a fixed resistor and a variable resistor with a common terminal connecting in parallel to the fixed resistor, the common terminal of the variable resistor connecting to one of the output terminals which is closer to the common terminal per se, said first to third circuit being connected in parallel and wherein B constant of the thermistor falls within a range 2,000° K. to 3,000° K. and the resistance value of the thermistor falls with a range 0.5 KΩ to 5 KΩ, and the resistance value of the temperature sensitive element with a positive primary temperature coefficient falls within a range 0.5 kΩ to 5 KΩ.

4,173,149

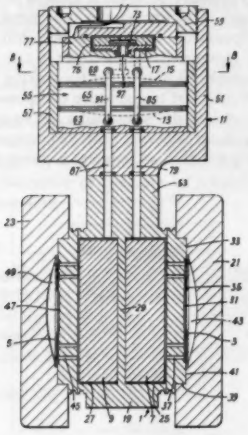
DIFFERENTIAL PRESSURE SENSING DEVICES

Donald L. Critten, and Charles E. Bardwell, both of Luton, England, assignors to George Kent Limited, Luton, England

Filed May 2, 1978, Ser. No. 902,224
Claims priority, application United Kingdom, May 2, 1977, 18295/77
Int. Cl.² G01L *13/02*
U.S. Cl. 73—706 **16 Claims**

1. A pressure sensing device wherein a first part of the device contains a first volume of liquid and has a side wall comprising a flexible separator diaphragm through which, in use, pressure is transmitted from a working fluid to said first volume of liquid, sensing means are provided for sensing pressure applied to said first volume of liquid or a difference between the pressure applied to said first volume of liquid and pressure of a fluid outside said first part of the device, a first overload diaphragm has opposed surface thereof subjected to

the pressure of the first volume of liquid and the pressure of the outside fluid, respectively, said first overload diaphragm comprises a dished plate having an inner section which extends inwardly of said first part of the device relative to a peripheral section thereof, said first overload diaphragm is inflexible or substantially inflexible over a working range of differential pressures between said first volume of liquid and the outside fluid but becomes flexible and changes in shape when the pressure of the working fluid increases to a value such that the pressure applied to said first volume of liquid exceeds the pressure of the outside fluid by a predetermined amount, there



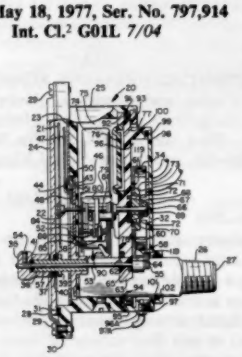
then being a movement of said inner section relative to said peripheral section in a direction outwardly of said first part of the device sufficient to allow a movement of said separator diaphragm inwardly of said first part, and means are associated with said separator diaphragm which serve, when said separator diaphragm has moved inwardly by a predetermined amount, to cause a resistance to further inwards movement and to prevent any further increase in the pressure of the working fluid from being applied via said first volume of liquid to said sensing means, changes in said first volume of liquid, when the said associated means have operated, being accommodated by changes in shape of said first overload diaphragm.

4,173,150

SENSOR WITH ADJUSTABLE PRESSURE RESPONSIVE DETECTION AND CONTROL

Tommy L. Gray, Dallas, Tex., assignor to Span Instruments, Inc., Plano, Tex.

Filed May 18, 1977, Ser. No. 797,914
Int. Cl.[2] G01L 7/04
U.S. Cl. 73—714 **39 Claims**



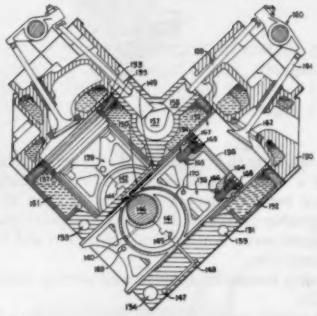
1. A pressure change responsive system for sensing a predetermined pressure limit: a pressure change sensitive device; mounting means for said pressure change sensitive device; said device having an output end remote from connection of said device to said mounting means; pivot means in said mounting means for a pivotally mounted arm connected for movement by the output end of said pressure change sensitive device, said arm including trip means; sensor means mounted in said mounting means for actuating engagement by the trip means of said arm when the arm is pivoted to a predetermined limit as driven by fluid pressure change induced movement of the output end of said pressure change sensitive device wherein said sensor means is fastened to a pivotally mounted plate pivotal about a pivot axis common to said pivot means; and pressure limit setting means for selectively adjusting the predetermined pressure limit position of said sensor means.

4,173,151

MOTION TRANSLATING MECHANISM

Reed H. Grundy, 4081 W. Benden Dr., Murrysville, Pa. 15668

Filed Jun. 30, 1977, Ser. No. 811,529
Int. Cl.[2] F16H 21/18
U.S. Cl. 74—49 **3 Claims**



1. A multi-reciprocating displacement member to rotary motion mechanism including in combination,

(a) a crankshaft having a crank arm with an eccentric pin integrally secured to said crank arm, said crankshaft mounted so that said crank arm and said eccentric pin rotate about a crankshaft axis,

(b) at least two circular linkpieces each having a center axis parallel to said crankshaft axis, each of said circular linkpieces having an opening positioned eccentric to said center axis of each of said circular linkpieces, said circular linkpieces mutually secured to each other such that said eccentrically positioned openings share a common axis,

said crank arm eccentric pin positioned within said circular linkpieces eccentric openings in a manner that allows relative rotary movement between said eccentric pin and said mutually secured circular linkpieces in a path in a fixed zone defined by said circular linkpieces movement,

(c) at least two displacement members mounted for reciprocating motion within separate walled cylinders, each displacement member having opposed parallel flat surfaces positioned in mating engagement with flat surfaced regions of said walls of said cylinders,

said mating engagement providing bearings to support resultant thrust forces arising in said fixed zone,

each of said displacement members having a circular opening in said fixed zone, each of said displacement members circular openings having a central axis at right angles to said fixed zone and parallel respectively to said opposed parallel flat surfaces of said displacement members,

(d) each of said circular linkpieces are positioned such that they are in mating relationship within said displacement members circular openings, reciprocating motion trans-

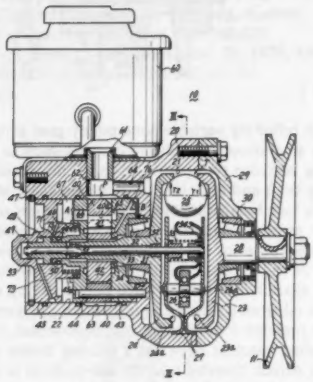
mitted to said displacement members is thereby converted to rotary motion and said resultant thrust force, said rotary motion of said crankshaft about said crankshaft axis arises through the relative motion of said displacement members, said mutually secured circular linkpieces and said integrally secured eccentric pin of said crankshaft crank arm and said resultant thrust forces are supported by said bearings.

4,173,152

CONTINUOUSLY VARIABLE SPEED CONVERTER FOR COOPERATIVE USE WITH A FLUID PUMP

Yukio Kondo, Toyota; Minoru Kawabata, Aichi, and Mikio Suzuki, Hekinan, all of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha and Toyota Jidosha Kogyo Kabushiki Kaisha, both of Aichi, Japan

Filed Oct. 19, 1977, Ser. No. 843,673
Claims priority, application Japan, Oct. 22, 1976, 51-127650
Int. Cl.[2] F16H *15/00, 15/40, 17/02*
U.S. Cl. 74—190 **13 Claims**



1. A continuously variable speed converter comprising:

a main housing;

input and output shafts rotatably carried in said main housing in axial alignment with each other;

a pair of friction discs respectively provided on said input and output shafts and formed with opposing guide ways;

a plurality of balls held in contact with said guide ways of said friction discs;

holding and adjusting means for holding said plurality of balls in contact with said guide ways and for angularly tilting the rotational axis of each of said balls in each plane, including the axis of said input shaft, so as to adjust the output/input speed ratio;

a pump casing received within a pressure chamber, formed in said main housing, for movement in an axial direction of said output shaft and having an internal cam bore;

a pump rotor received within said internal cam bore and mounted on said output shaft for being driven thereby so as to deliver pressurized fluid into said pressure chamber; and

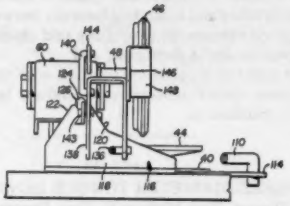
first and second side plates held in contact with both sides of said pump casing and rotor and formed at respective outer sides with first and second areas for receiving pressure of fluid delivered into said pressure chamber, said first and second areas being different from each other in effective area so as to axially pressure said output shaft toward said input shaft.

4,173,153

FRICTION DISC TRANSMISSION

Alan G. Klug, and John H. Marto, both of Oshkosh, Wis., assignors to J. I. Case Company, Racine, Wis.

Filed May 17, 1977, Ser. No. 797,706
Int. Cl.[2] F16H *15/10;* **A01D** *69/8*
U.S. Cl. 74—197 **8 Claims**



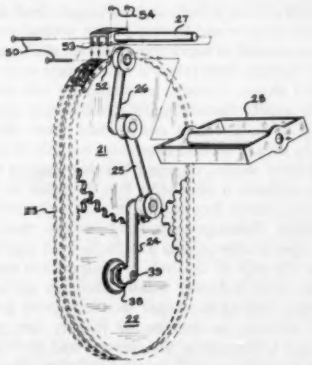
1. A friction disc transmission, comprising: a drive disc rotatably supported on a generally vertical shaft, power means rotating said drive disc, a driven friction disc rotatably supported above said drive disc on a horizontal shaft, said horizontal shaft supported on a frame means yieldably biasing said friction disc against said drive disc, said vertical drive disc shaft mounted on a laterally swingable support, said support swingable about a vertical axis generally parallel to and spaced from said vertical drive disc shaft, a control guide on said support having an upwardly facing vertically inclined camming face extending generally tangent to an arc drawn about said vertical support axis and a guide on the distal end of said frame means engaging said camming face upon lateral swinging movement of said support vertically lifting said frame means and said friction disc out of engagement with said drive disc.

4,173,154

BICYCLE DRIVE SPROCKET SYSTEM

Nile E. Sawmiller, and Craig S. Sawmiller, both of 784 S. Metcalf St., both of Lima, Ohio 45804

Filed Nov. 16, 1977, Ser. No. 851,827
Int. Cl.[2] F16H *9/00, 11/00*
U.S. Cl. 74—217 B **7 Claims**



1. A drive mechanism for a foot propelled vehicle comprising, in combination, an upper pair of chain sprockets rotatably journaled on an upper horizontal axis extending transverse of the vehicle frame, said upper pair of sprockets axially spaced from each other and secured together for rotation about said upper axis,

a lower pair of chain sprockets rotatably journaled on a lower horizontal axis extending parallel to said upper axis, said lower pair of sprockets axially spaced from each

other along said lower axis and lying in closely adjacent, parallel planes from the plane of said upper chain sprockets,

a pair of double strand chains extending around and engaging with the peripheries of said upper and lower pairs of chain sprockets with one double chain interconnecting with one upper and one lower sprocket, and the other interconnecting with the other upper and lower sprocket,

a pair of pedals secured to said chains in diametric opposition to each other and extending laterally outwardly therefrom to provide means for propelling said chains and sprockets in rotation about their axes, and

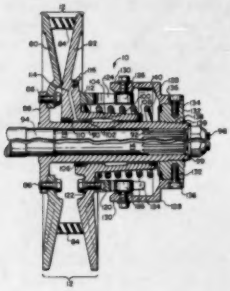
a drive member secured for rotation with one of said upper or lower sprockets to provide a power takeoff from said drive mechanism.

4,173,155

VARIABLE DIAMETER TORQUE SENSING DRIVE

Paul G. Togami, East Moline; T. Gary Drayer, Silvis, both of Ill., and James M. Francis, Bettendorf, Iowa, assignors to International Harvester Company, Chicago, Ill.

Filed Sep. 16, 1977, Ser. No. 833,776
Int. Cl.[2] F16H *55/52, 55/56*
U.S. Cl. 74—230.17 M **12 Claims**



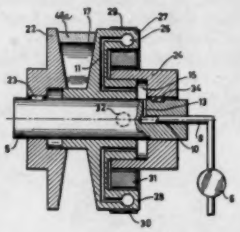
1. A torque sensing unit adapted for use in driving the threshing rotor of a harvesting combine, said unit comprising a variable diameter input sheave designed for cooperation with an engine-driven V-belt, and an output shaft concentric with the input sheave and having means whereby it may be drivingly connected to said rotor, an inner sleeve mounted on said shaft in axially fixed relation for rotation in unison therewith, an outer sleeve rotatably mounted on said inner sleeve and slidable axially therealong, a fixed sheave section extending radially from the front end of said inner sleeve, an axially shiftable sheave section extending radially from the front end of said outer sleeve, opposed V-belt engaging surfaces on said sheave sections, a collar-like hub mounted on the rear end of said inner sleeve for rotation in unison therewith, a generally cylindrical follower-supporting sleeve pivotally mounted about a pivot axis on said hub for limited axial side sway relative to the axis of the hub, a compression spring interposed between said hub and axially shiftable sheave section and yieldingly biasing the latter sheave section toward the fixed sheave section, an open-ended tubular cam member coaxial with and surrounding the sleeves and having its front rim region secured to said axially shiftable sheave section and projecting rearwardly therefrom, a pair of diametrically disposed generally V-shaped in configuration rearwardly opening cam races formed in the rear rim region of said cam member, a pair of roller-type cam followers projecting in diametric fashion into the confines of a respective cam race and carried in diametrically opposed relationship by said generally cylindrical follower-supporting sleeve upon coaxial axes parallel to said pivot axis and cooperating with said cam races whereby differential rotational movement between said sheave sections incident to the frictional drag exerted by the V-belt on said movable sheave section tending to cause the same to overrun the fixed sheave section incident to an increase in the load on the output shaft will exert a camming action by the followers against the cam races and augment the biasing action of said spring against said axially shiftable sheave section.

4,173,156

INFINITELY VARIABLE CONE PULLEY GEAR

Alexandre Horowitz, Eindhoven; Rudolf J. G. A. van der Hoorn, Nuenen, and Jozef W. M. Kummeling, Leende, all of Netherlands, assignors to Volvo Car B.V., Eindhoven, Netherlands

Filed Sep. 29, 1977, Ser. No. 837,922
Claims priority, application Netherlands, Oct. 5, 1976, 7611001
Int. Cl.[2] F16H *55/52*
U.S. Cl. 74—230.17 F **25 Claims**



1. An infinitely variable cone pulley gear arrangement comprising an endless transmitting element such as a belt or chain running between two pairs of conical discs, one of these on a driving shaft and the other on a driven shaft, at least one disc of each pair being slidable in axial direction on its shaft, hydraulic means producing a control axial pressure on the slidable cones so as to adjust themselves automatically in dependence of the torque transmitted by the driving shaft to the driven shaft, a hydraulic service line receiving a pressure fluid such as oil from a suitable source under pressure and distributing the pressure to the cones to be pressurized, wherein, within a coupling element between a driving motor and a variator section driven thereby a hydraulic cushion is applied so sole means for the transfer of the torque to or from said variator section, free of metallic contact between said variator section and said driven shaft, said service line being connected to a chamber for hydraulic medium in said coupling element, wherein the pressure created in said cushion depends on torque.

4,173,157

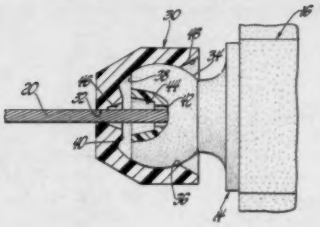
MOTION TRANSMITTING REMOTE CONTROL ASSEMBLY

Donald M. Miller, Pontiac, and Grant A. Webb, West Bloomfield, both of Mich., assignors to Teleflex Incorporated, Limerick, Pa.

Filed Apr. 14, 1978, Ser. No. 896,319
Int. Cl.[2] F16C *1/10*
U.S. Cl. 74—501 R **10 Claims**

1. A motion transmitting remote control assembly of the type for transmitting forces along a curved path by a motion transmitting core element, said assembly comprising; a guide means, a flexible motion transmitting core element movably supported by said guide means with a first end thereof extending from said guide means to provide a variable extended length of said core element between said guide means and said first end, terminal means disposed on said first end of said core element for operatively attaching said core element to a control member, and wiper means supported by said guide means for swivelling movement relative thereto and in wiping engagement with said core element for preventing foreign matter on said extended length of said core element from entering said

guide means upon movement of said core element and whereby the axis of said extended length may move in a conical area as allowed by said swivelling movement, said guide



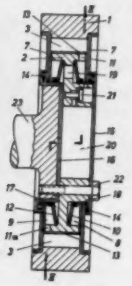
means including a male spherical end portion and said wiper means comprising a female spherical member movably disposed on said end portion.

4,173,158

TUNED ABSORBER FOR TORSIONAL VIBRATIONS WITH HYDROSTATIC DAMPING

Leonhard Geislinger, Höfelgasse 26, Salzburg, Austria

Filed Jan. 18, 1977, Ser. No. 760,430
Claims priority, application Austria, Jan. 23, 1976, 438/76
Int. Cl.[2] F16F *15/00*; F16D *63/00*
U.S. Cl. 74—574 **7 Claims**



1. A tuned absorber for torsional vibrations with hydrostatic damping, which comprises

(a) an outer member,

(b) an inner member,

(1) the outer and inner members being rotatable relative to each other, and

(2) the outer and inner members defining primary chambers therebetween, the primary chambers comprising at least one first primary chamber arranged to decrease in volume upon relative rotation of the outer and inner members in one sense and at least one second primary chamber arranged to increase in volume in response to said rotation,

(c) a damping liquid in the primary chambers,

(d) means defining secondary chambers, the secondary chambers comprising first and second secondary chambers,

(e) resilient means arranged in each one of the secondary chambers to exert no torque on the outer and inner members, and

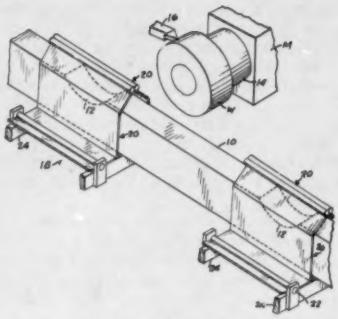
(f) passages connecting each one of the first the primary and secondary chambers, on the one hand, and each one of the second primary and secondary chambers, on the other hand, for permitting the liquid to flow from the primary chambers to the secondary chambers for applying liquid pressure to the resilient means in the secondary chambers.

4,173,159

TRANSFER MECHANISM AND METHOD

Frank C. Skrentner, Bloomfield Hills, Mich., assignor to F. Jos. Lamb Company, Warren, Mich.

Filed May 18, 1978, Ser. No. 907,000
Int. Cl.[2] B23B *3/00, 13/00*
U.S. Cl. 82—1 C **12 Claims**



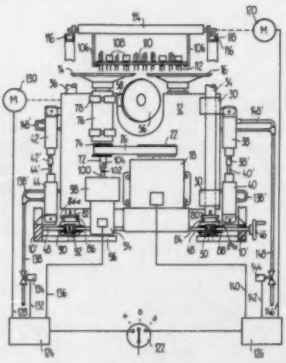
1. In a transfer machine which includes a plurality of regularly spaced machining stations and a transfer bar for indexing workpieces through said successive stations, said transfer bar having work carriers thereon spaced to correspond with the spacing between said stations and being reciprocable through advance and retract strokes corresponding in length to the spacing between successive stations to position the workpieces successively at each of said stations, that improvement which comprises, means for arresting movement of the transfer bar at approximately the mid point of its retract stroke to permit machining the workpieces at the stations while the work carriers are located approximately midway between successive stations.

4,173,160

MACHINE FOR CUTTING THE LEAD ENDS OF COMPONENTS MOUNTED AT PRINTED-WIRING BOARDS

Fritz Hess, Mettmenstetten, Switzerland, assignor to EPM AG, Zurich, Switzerland

Filed Feb. 27, 1978, Ser. No. 881,798
Claims priority, application Switzerland, Mar. 7, 1977, 2790/77
Int. Cl.[2] B26D *7/12*
U.S. Cl. 83—174 **16 Claims**



1. A machine for cutting the lead ends of components mounted at a printed-wiring board, comprising:

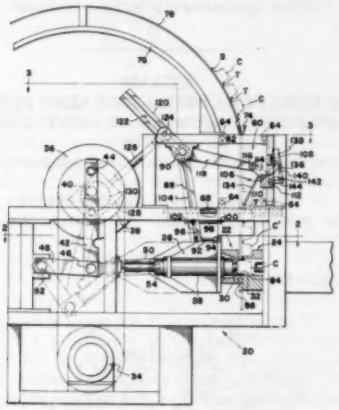
at least one rotatable cutting disk;
means for driving said cutting disk;
a grinding device for grinding said cutting disk;
means for enabling said cutting disk and said grinding device to be advanced in relation to one another;
said grinding device comprising a grinding disk;
said cutting disk having a pair of oppositely situated faces;
one of the faces of said cutting disk being located in confronting neighboring relationship to the printed-wiring board which is being processed;
the other of said faces of said cutting disk being directed away from said printed-wiring board;
said enabling means including means mounting said grinding disk adjacent said cutting disk at the side of the face of said cutting disk which is directed away from the printed-wiring board to be processed;
the plane containing the grinding disk being arranged at least approximately at right angles to the plane containing the cutting disk;
said rotatable cutting disk including a rotational shaft defining an axis of rotation for the cutting disk;
said axis of rotation being disposed at least approximately in the plane containing the grinding disk;
means for stationarily mounting said grinding disk;
said enabling means including structure for advancing said cutting disk downwardly in axial direction towards said stationarily mounted grinding disk.

4,173,161

TRIM PRESS

Albert W. Arends, Gladwin, and George L. Pickard, Beaverton, both of Mich., assignors to Leesona Corporation, Beaverton, Mich.

Filed Sep. 6, 1977, Ser. No. 831,093
Int. Cl.[2] B26F *1/40*
U.S. Cl. 83—278 **13 Claims**



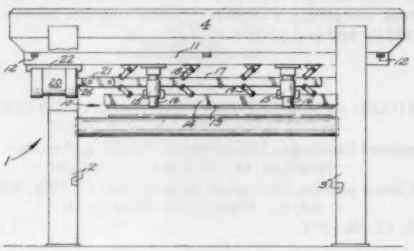
1. In a trim press for severing cup-shaped articles formed in synthetic plastic sheet material from the sheet, said press including a frame, die means on said frame for receiving an article integral with said sheet to locate the article relative to said frame, reciprocable punch means movable on said frame to and from said die means for severing an article located in said die means from said sheet upon the forward stroke of said punch means, drive means for driving said punch means in reciprocation, and feed means for intermittently feeding said sheet with articles formed therein to said die means in synchronism with the stroke of said punch means; the improvement wherein said feed means comprises a treadle mounted on said frame for reciprocating movement along a first path parallel to the path of movement of said reciprocable punch means, first means coupling said treadle to said punch means for coordinating the movement of said treadle with the stroke of said punch means, sheet guiding means fixedly coupled to said treadle for guiding said sheet in movement to said die means, and feed finger means for feeding said sheet to said die means in intermittent movement coordinated with the stroke of said punch means.

4,173,162

PNEUMATICALLY BRAKED BLADE ASSEMBLY FOR A CLIPPER MACHINE

Ernest P. Shaughnessy, Rte. 1, Box 474, Portland, Oreg. 97231

Continuation-in-part of Ser. No. 717,200, Aug. 24, 1976, abandoned. This application Jan. 16, 1978, Ser. No. 869,650
Int. Cl.[2] B26D *5/12*; B27L *5/08*
U.S. Cl. 83—617 **17 Claims**



1. In combination with a toggle assembly of a clipping machine, a reciprocally cyclical blade carried by said assembly with a cutting stroke and a return stroke coincident with lengthwise movement of a toggle bar and passage of toggle linkages through an upright position, the improvement comprising,

a pneumatic cylinder of the double acting type imparting lengthwise movement to the toggle bar of the toggle assembly causing one reciprocal cycle of blade operation, a piston within said cylinder having axial extensions of reduced diameter, a piston rod, and end caps closing the cylinder and each defining a central recess to alternatively receive said piston extensions, each end cap recess in communication with a valve controlled pressurized source of air for alternately powering the piston, and cylinder exhaust means within each of said end caps, said exhaust means including pressurized air biased valve members alternately opening to vent a non-constant flow of air from ahead of the moving piston from the cylinder interior at a predetermined cylinder pressure value the build up of which pressure dissipating blade and toggle assembly inertia to prevent blade rebound from a blade rest position.

4,173,163

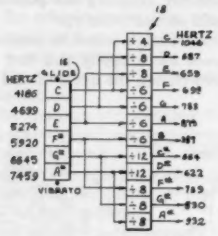
TONE GENERATOR FOR ELECTRONIC ORGAN

Stephen L. Howell, Jasper, Ind., assignor to Kimball International, Inc., Jasper, Ind.

Filed Jul. 8, 1977, Ser. No. 813,826
Int. Cl.[2] G10H *5/06*
U.S. Cl. 84—1.01 **6 Claims**

1. The method of generating tone frequencies for musical purposes, especially for use in electronic organs, which comprises: generating six input frequencies which are related in frequency substantially as selected diverse tones of the chromatic scale, dividing each frequency by a factor of a whole number multiple of four and by a factor of a whole number multiple of six to produce two respective output frequencies corresponding to the respective input frequency thereby pro-

viding a set of twelve said output frequencies related in frequency substantially as the corresponding tones of the chro-



matic scale of one octave, each of said output frequencies being a substantially symmetrical wave form.

4,173,164

ELECTRONIC MUSICAL INSTRUMENT WITH FREQUENCY MODULATION OF A TONE SIGNAL WITH AN AUDIBLE FREQUENCY SIGNAL

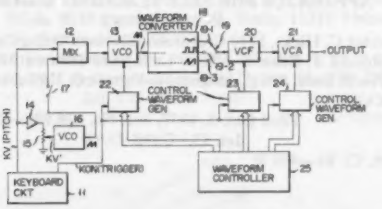
Takeshi Adachi; Masahiko Koike, and Toshiyuki Takahashi, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Filed May 25, 1978, Ser. No. 909,370

Claims priority, application Japan, Jun. 1, 1977, 52-64157; Dec. 13, 1977, 52-148846; Dec. 21, 1977, 52-154099

Int. Cl.[2] G10H *1/04, 5/00*

U.S. Cl. 84—1.19 **11 Claims**



1. An electronic musical instrument comprising:

keyboard circuit means for providing a pitch determining voltage signal having a magnitude which is a function of the note of a depressed key;

first voltage-controlled frequency-variable oscillator means coupled to said keyboard circuit means to receive the pitch determining voltage signal therefrom for producing a first audible frequency signal the frequency of which corresponds to the note of the depressed key;

second voltage-controlled frequency-variable oscillator means coupled to said keyboard circuit means to receive the pitch determining voltage signal therefrom for producing a second audible frequency signal; and

means for coupling the second audible frequency signal from said second voltage-controlled oscillator means to said first voltage-controlled oscillator means to thereby produce a frequency-modulated tone signal in which the first audible frequency signal is frequency-modulated with the second audible frequency signal.

4,173,165

FIXEDLY MOUNTED MUTE FOR STRINGED INSTRUMENTS

Mordy M. Rhodes, 5056 N. Albany Ave., Chicago, Ill. 60625

Filed Jun. 26, 1978, Ser. No. 919,244

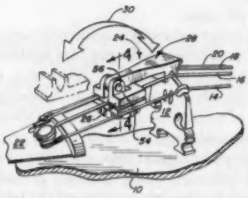
Int. Cl.[2] G10D *3/04*

U.S. Cl. 84—311 **9 Claims**

1. In a mute for a stringed instrument that is to be attached to portions of the instrument's strings, that are located between the instrument's bridge and the anchoring member to which the strings attach, by mounting means of a width to overlie and underlie portions of two strings and including upper and lower plate members for respectively engaging upper and lower edges of the strings and adapted to be positively clamped onto said strings to provide an immovable support; the improvement comprising in combination:

an elongated mute member pivotly mounted at one end thereof on one of said members for swinging only about a horizontal axis between an operative position, in which the mute member extends above and across said upper plate member to have its other end engage the instrument's bridge, and an inoperative position, and

selectively operable clamping means operatively associated with said upper and lower plate member for biasing said members toward each other to clamp portions of strings of the instrument therebetween and to selectively locate the mounting means and mute member in position longitudinally of the strings, so that the mute member will be properly positioned to be selectively swung between operative and inoperative positions, said clamping means including a rotatable member positioned below the lower plate member in a plane spaced away from the region in which the mute member is pivoted to swing between operative and inoperative positions, whereby swinging of the mute member and manipulation of the rotatable member of the clamping means may each be separately effected without interference with the other.



5. In a mute for a stringed instrument that is to be attached to portions of the instrument's strings that are located between the instrument's bridge and the anchoring member to which the strings attach, by mounting means of a width to overlie and underlie portions of two strings and including upper and lower plates for respectively engaging upper and lower edges of two strings and adapted to be positively clamped onto said strings to provide an immovable support, the improvement comprising, in combination:

the lower plate being apertured, a threaded attachment stud extending downwardly from the upper plate through the aperture of the lower plate, and below said lower plate;

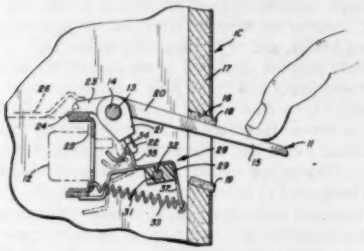
a mute member pivotly mounted on said mounting means;

a nut member mounted on the threaded attachment stud and being selectively manually adjustable to bias the two plates toward each other to clamp portions of the strings of the instrument therebetween, to provide the positive clamping of the mounting means onto the strings of the instrument; and the threaded attachment stud being non-pivotable relative to the upper plate and having a non-circular cross-section, and the aperture in the lower plate through which the stud extends being non-circular to cooperate with the non-circular cross-section of the stud to prevent pivoting of the lower plate relative to the upper plate.

4,173,166
TAB SWITCH MECHANISM FOR MUSICAL INSTRUMENTS

Donald B. Koepke, Franklin Park, Ill., assignor to Thomas International Corporation, Chicago, Ill.

Filed Nov. 7, 1977, Ser. No. 848,891
Int. Cl.[2] G10B *3/10*; H01H *9/26*
U.S. Cl. 84—343 **10 Claims**



1. In a musical instrument having a plurality of electrical switches, and a plurality of tablets having switch actuating means mounted for selectively actuating the respective electrical switches and defining switch actuating and switch releasing positions, an improved switch mechanism comprising:

a plurality of cam followers associated one each with said tablets;

biasing means for urging each said tablet to its switch releasing position;

a plurality of cams;

a pivotally mounted carrier resiliently supporting said cams for joint movement adjacent said tablets to have engagement one each by said cam followers, said tablets being held releasably in said switch actuating position as an incident of engagement of the cam followers thereof with said cams, said cams defining a high portion and first and second low portions at opposite sides of said high portion, said cam followers being disposed at said first low portion in the switch releasing position of the tablet, at said second low portion in the switch actuating position of the tablet, and in engagement with said high portion during movement of the tablet between said positions; and

spring means biasing said carrier for selectively urging said cams into engagement with said cam followers, said cams and cam followers being correlated so that movement of any selected tablet from either of said positions to the other of said positions releases any other tablet in the switch actuating position to be returned by said biasing means to its switch releasing position as an incident of the cam follower of the selected tablet engaging said high portion of its associated cam during said movement.

4,173,167
ORGAN STOP SWITCHING SYSTEM

Donald E. Stanley, Hillsboro, Oreg., assignor to CBS, Inc., New York, N.Y.

Filed Feb. 23, 1978, Ser. No. 880,438
Int. Cl.[2] G10B *3/10*
U.S. Cl. 84—345 **13 Claims**

1. An organ stop switching system comprising:

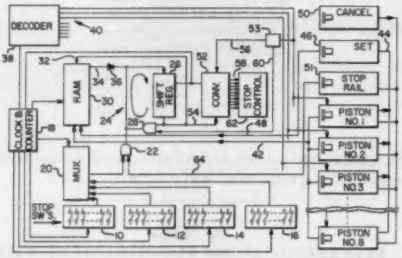
a plurality of manually operable stop elements and means for electrically registering the positions of said stop elements in serial order,

a first memory for storing plural different combinations of stop elements at different memory locations and means for cyclically accessing said locations in said first memory,

a second memory and means for cyclically accessing locations in said second memory wherein the capacity and operating cycle of said second memory are less than said first memory for storing a combination of stop element positions,

means for selectively coupling the positions of said stop elements to said second memory,

a plurality of combination selection pistons and means responsive thereto for coupling said first memory to said second memory during the cycle of said second memory



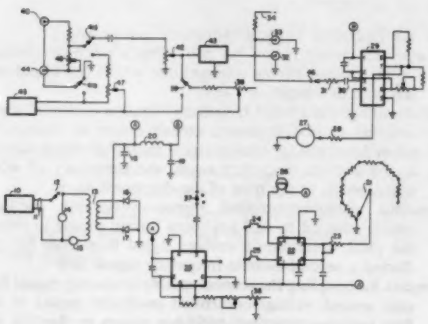
corresponding to a portion of the cycle of said first memory for entering combinations into said first memory so that different selected combinations from said first memory are transferable into said second memory in additive relation,

and means for receiving the output of said second memory for operating stop responsive means.

4,173,168
APPARATUS FOR SELF TEACHING A MUSICAL INSTRUMENT

Patrick C. Hicks, 5140 Greenbush, Sherman Oaks, Calif. 91403; Ronald J. Benson, Arleta, Calif., and Howard M. Roberts, North Bend, Oreg., assignors to Patrick C. Hicks, Hollywood, Calif.

Filed Oct. 3, 1977, Ser. No. 838,980
Int. Cl.[2] G09B *15/00*
U.S. Cl. 84—470 R **1 Claim**



1. An integrated portable instructional apparatus for music instruction use comprising:

a portable case including a body portion openable cover and carrying means;

music instructional apparatus within said case comprising in combination;

a metronome for generating controllable frequency timing signals for establishing any of several music tempos;

a tape recorder for recording music produced by the user and for playing music produced by the user or pre-recorded music;

a jack for connecting said apparatus to earphones;

a timer for providing an indication to the user of elapsed time period during use of the apparatus;

said apparatus including input jacks to receive electrical input signals from at least one musical instrument and from said tape recorder;

switch means for selectively introducing electrical signals from said instrument input jack to the input of said tape recorder or to said earphone jack;

switch means for enabling said metronome and for setting the amplitude thereof;

switch means for enabling and selecting the time interval of said timer;

a signal generator responsive to the completion of a time interval as selected by said last switch means;

means for introducing the output of said signal generator into the jack for said earphone;

switch means for selectively introducing the output of said metronome into said earphone jack or said recorder;

individual volume control means for said instrument, tape recorder, metronome, and signal generator; and

means within said case mounting said tape recorder and its controls and each of said switch means and each volume control means for operation by said user when said cover is open to initiate and control the volume of tempo signals from said metronome, signals from user's instrument, timer signals from said signal generator and the recorder whereby user may control practice duration by the timer switch, tempo by said said metronome and for listening to pre-recorded or user's own instrument input either with or without tempo signal background.

4,173,169

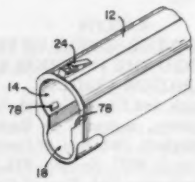
SEMI-AUTOMATIC FIREARM

Patrick Yates, P.O. Box 5779, China Lake, Calif. 93555; Sydney H. Woodcock, Penthouse Seattle Tower, 3rd & University, Seattle, Wash. 98101, and Jeffrey R. Beals, 11216 Phinney Ave. North, Seattle, Wash. 98133

Continuation-in-part of Ser. No. 692,297, Jun. 8, 1976, abandoned. This application May 9, 1977, Ser. No. 794,738

Int. Cl.[2] F41D *11/00*

U.S. Cl. 89—132 **17 Claims**



1. In a semi-automatic firearm having a firing chamber, a barrel, a frame, a slide movable with respect to said barrel and said frame between battery and full recoil positions, means for sequentially ejecting a spent cartridge and loading a fresh cartridge during each recoil stroke, and a firing mechanism for selectively initiating said cartridge when said slide is in battery, the improvement comprising a recoil mechanism for allowing the recoil of said cartridge to carry said slide rearwardly toward said full recoil position, and for subsequently returning said slide to its battery position, said recoil mechanism including first and second recoil springs each extending between said frame and said slide, said improvement further including barrel guide means for fixing the radial position of the forward portion of said barrel when said slide is in battery position, said guide means including barrel mounting means at the forward end of said slide for supporting said barrel at the forward end thereof on two discrete, spaced apart, substantially immovable support areas symmetrically positioned about the central axis of said slide beneath said barrel when said slide is in battery position, and linkage means pivotally securing said barrel to said frame at a point rearward of and between said support areas, and diametrically spaced from an area of contact between said slide and barrel such that the force of said barrel exerted by said slide in a forward direction generates a rotational moment about the pivot axis of said linkage means for resiliently biasing the forward end of said barrel against said support areas.

4,173,170

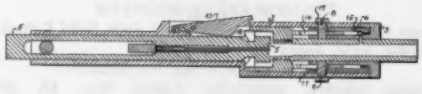
POLICE FIREARM

Ross A. Close, 3831 Glenbrook Rd., Fairfax, Va. 22031

Filed Jan. 16, 1978, Ser. No. 867,931

Int. Cl.[2] F41D *5/10*

U.S. Cl. 89—188 **1 Claim**



1. A firearm comprising in combination a frame having a longitudinally movable floating ring receiver piston combined threadedly with a barrel contained within the two parts of a ring power cylinder turned to release a concentric bolt by cams cut in the piston part of the floating ring receiver piston actuated to turn the floating ring receiver piston by pins through the frame, float-ring receiver piston and ring power piston to release locking lugs between bolt and floating ring receiver piston actuated by gas pressure from a port in the barrel and ring power cylinder, feeding high pressure gas to chamber formed by floating ring receiver piston and ring power cylinder.

4,173,171

WORKING PROCESS OF A PNEUMATIC OPERATED RAMMING TOOL

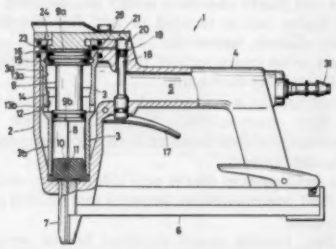
Wilfried Lange, Altenhagen, Fed. Rep. of Germany, assignor to Firma Dieter Haubold Industrielle Nagelgerate, Hemmingen-Westerfeld, Fed. Rep. of Germany

Filed Jun. 17, 1977, Ser. No. 807,606

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1976, 2630278

Int. Cl.[2] F15B *15/17, 15/22*

U.S. Cl. 91—25 **7 Claims**



1. In a pneumatically-operated ramming tool, the combination comprising:

a compressed air storage chamber;

a hollow, working cylinder having internal walls which define a generally cylindrical, internal cavity, comprising an upper pressure portion having an upper end and a lower end and a lower guide portion, the upper end of said pressure portion having a closable control port and the lower end of said pressure portion having a plurality of connecting apertures, both of which establish communication with said compressed air storage chamber; and

a piston slidably received within said cavity of said cylinder for reciprocable movement between an upper rest position and a lower work position, said piston having a top end

which is reciprocably movable only within the pressure portion of said cylinder and which carries two vertically, spaced-apart, flexible seal rings, with the lower one of said two seal rings having a variable diameter, so as to serve as a return stroke seal, a bottom end which is reciprocably movable only within the guide portion of said cylinder and which carries a flexible seal ring, and an intermediate portion joining said top and bottom ends thereof, and defining an annular gap between said piston and said cylinder walls.

4,173,172

TANDEM BRAKE BOOSTER

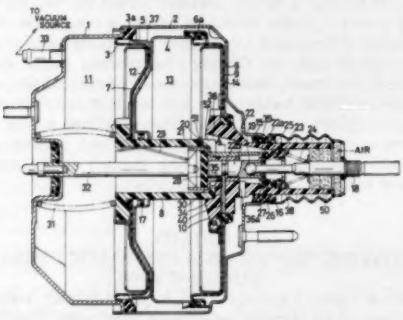
Atsushi Ohmi, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 14, 1978, Ser. No. 886,459

Claims priority, application Japan, Mar. 19, 1977, 52/33734[U]

Int. Cl.[2] F15B *9/10*; F01B *19/00*

U.S. Cl. 91—369 A **5 Claims**



1. A tandem diaphragm brake booster comprising:

a housing;

first and second diaphragms disposed in said housing in spaced relation to each other;

a partition wall disposed between said first and second diaphragms within said housing for defining first, second, third and fourth chambers within said housing;

a first piston means secured to said first diaphragm and axially slidable therewith;

a second piston means secured to said second diaphragm and axially slidable therewith;

first fluid passage means provided in said first piston means for fluid communication between said first and third chambers, said first chamber being in communication with a vacuum source;

second fluid passage means provided in said partition wall for fluid communication between said second and fourth chambers;

third fluid passage means provided in said second piston means for fluid communication between said third and fourth chambers;

valve means disposed in said third fluid passage means for preventing fluid communication between said third and fourth chambers and introducing atmospheric pressure into said fourth chamber, thereby creating pressure differentials between said first and second chambers and said third and fourth chambers, respectively;

an operator-operated means for actuating said valve means in response to manual operation;

said valve means including a plunger operatively engaged with said operator-operated means and axially movable within said piston means;

a case member disposed in said first and second pistons and receiving therein said plunger; and

a key member disposed in said second piston means and extending to said plunger and said case member, thereby to retain said case member to said second piston means, one end of said first piston means being disposed between said case member and said second piston means, thereby connecting said two piston means by said key member.

4,173,173

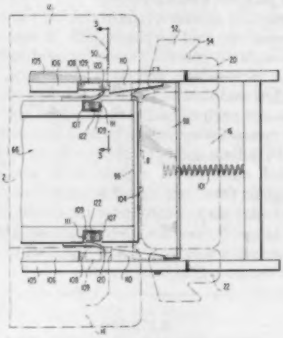
CARTON ERECTOR

Herman D. Mims, Charlotte, N.C.

Filed Nov. 28, 1977, Ser. No. 855,134

Int. Cl.[2] B31B *1/50*

U.S. Cl. 93—51 R **10 Claims**



1. A carton erecting apparatus of the type having a cooperating die and plunger, for erecting cartons of the type having an interlocking tab and slot, said apparatus comprising:

means for engaging said tab and preventing the outward movement thereof; and

means for pressing outwardly on said carton adjacent said slot for causing said tab and slot to interlock.

4,173,174

INSTALLATION FOR THE SUPPLY OF FRESH AND/OR HEATED AIR INTO THE INTERIOR SPACE OF A MOTOR VEHICLE

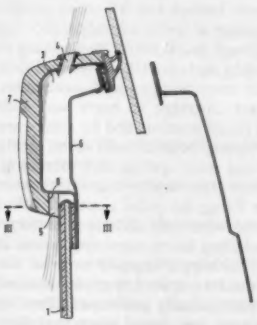
Michael Vinko, Munich, and Dieter Schmid, Neufahrn, both of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 2, 1977, Ser. No. 821,235

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1976, 2636640

Int. Cl.[2] B60H *1/24*

U.S. Cl. 98—2.04 **8 Claims**



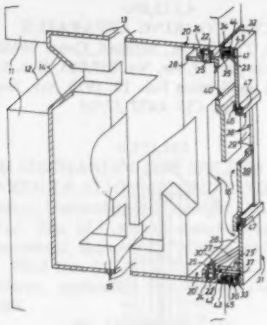
1. An installation for the supply of fresh and/or heated air into the interior space of a motor vehicle, comprising at least

one air-guide channel means provided within the area of an inner covering means of a vehicle body part, said air guide channel means being formed by a part of an inner wall of the vehicle body part and by a cover member mounted thereon and being in communication with air discharge openings directed into the vehicle interior space, characterized in that recess means forming said air discharge openings are provided within at least one of an edge area of the cover member, the inner covering means adjoining the cover member and the vehicle body part adjoining the cover member, and further characterized in that the cover member has an essentially U-shaped cross-sectional profile and the discharge openings are provided at both U-legs.

4,173,175
AIR VENT

Eckhard Kucharczyk, Netphen, Fed. Rep. of Germany, assignor to Siegenia-Frank KG, Siegen, Fed. Rep. of Germany

Filed Apr. 17, 1978, Ser. No. 897,151
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1978, 2718167
Int. Cl.² F24F *13/08*
U.S. Cl. 98—41 SV **6 Claims**



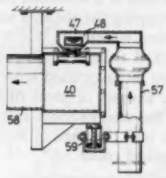
1. A vent device for rooms comprising a frame, a detachably mounted front plate with a plurality of apertures, a closure plate transversely to its plane and the plane of the front plate between a closed position wherein the closure plate abuts the front plate to close the apertures and an open position for freeing the apertures of the front plate for free air flow, whereby, the operating device has a push rod, movable within guides extending linearly and parallel to the longitudinal edges of the front plate, the closure plate having a flange extending transversely to the plane of the closure plate and extending over its total length adjacent the push rod, said flanges being provided with a plurality of slanted slots and said push rod being provided with a plurality of pins for engagement with said slots, the free edge of the flange having openings connected to the slots for allowing egress of the pins and removal of the closure plate.

4,173,176
DEVICE FOR TRANSFER OF AIR IN ONE OR THE OTHER DIRECTION BETWEEN TWO PLACES

Eric Svensson, Box 465, 801 06 Gävle, Sweden

Filed Jan. 3, 1978, Ser. No. 866,415
Claims priority, application Sweden, Jan. 10, 1977, 7700177
Int. Cl.² F23J *15/00*
U.S. Cl. 98—115 VM **7 Claims**

1. A device for transfer of air mixed with gases, vapours, smaller particles etc. or of fresh air in the one or other direction between a stationary place and a moving intake or exhaust place, comprising: an elongated box with walls and fluid communication tube means connected to its interior; said tube means having its other end adapted to be connectable to a stationary inlet or outlet; one wall of said box, in its longitudinal direction, having a longitudinal slot; an elongate tightening band extending along and over said slot in its longitudinal direction; a connection body, with air passage means therethrough, arranged on said box and through the slot for longitudinal movement along said slot with its passage means in continuous fluid communication between the interior and exterior of said box and with an air passage conduit means projecting from said connection body so that the free opening of said conduit means, during movement of the connection body

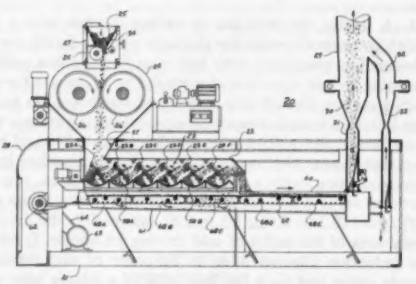


being moved to varying places within an area; portions of said wall adjacent said slot have elongate contact surfaces; said connection body having engagement means bearing on said contact surfaces, disposed on one side of said slotted wall, guided slide shoe means on the opposite side of said slotted wall, and stay plates on said connection body on said one side of the slotted wall; a rotatable press roller supported by said stay plates adjacent each slide shoe means; and backing rollers supported by said connection body; means attaching the ends of said tightening band to the ends of said box with said band passing under the press rollers and over the backing rollers.

4,173,177
DECORTICATOR AND SEPARATOR FOR SEED PRODUCTS

Floyd O. Davis, 2326 E. Buckeye Rd., Phoenix, Ariz. 85034

Filed Jul. 20, 1978, Ser. No. 926,453
Int. Cl.² B02B *3/04*
U.S. Cl. 99—618 **13 Claims**



1. A decorticator/separator apparatus for seed products comprising:

a frame,

a decorticator mounted on said frame and comprising a pair of juxtapositioned parallelly arranged rollers journaled for rotation about their axes in a direction toward each other,

a hopper mounted on said frame substantially vertically above said decorticator for dispensing seeds between the rollers of said decorticator,

said rollers being spaced apart from each other a small predetermined distance,

each of the outer surfaces of said rollers being provided with cutting ribs extending in a parallel arrangement with a longitudinal lead thereof which cutting ribs cooperate to receive in grooves therebetween the seeds,

the seed being turned by said cutting ribs on each of said

rollers when engaging therewith to extend longitudinally of the cutting ribs on the rollers in the grooves existing between the cutting ribs as said rollers rotate at a differential speed,

the cutting ribs on said rollers shearing the hulls of the seeds as the seeds pass between said rollers, and

a separator mounted below said decorticator for receiving the hull sheared seeds for separating the hulls from the kernels of meat of the seeds,

said separator comprising a plurality of spiked rollers journaled on said frame in a side by side parallel arrangement and rotating in unison in a common direction,

said decorticator dropping the sheared seed products on top of one of said spiked rollers,

said one of said spiked rollers while rotating moving said seed products over an associated screen for separating at least some of the kernels of meat of said seed products from the hulls of the seed product and moving the rest of the seed products into the path of movement of the next juxtapositioned spiked roller.

4,173,178

PROCESS FOR INTRODUCING A GAS, IN PARTICULAR CARBON DIOXIDE, INTO A LIQUID, PARTICULARLY A BEVERAGE, FLOWING THROUGH A LINE, AND A DEVICE FOR PERFORMING THE PROCESS

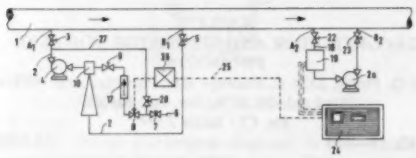
Dieter Wieland, Oststr. 1, D-4000 Düsseldorf, Fed. Rep. of Germany

Filed Sep. 21, 1977, Ser. No. 835,255

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1976, 2644378

Int. Cl.² B01F *3/04*

U.S. Cl. 99—323.1 **8 Claims**



1. A device for introducing carbon dioxide into a liquid which comprises a main line through which a liquid can pass, a bypass line branching from said main line at a first point and returning to said main line at a second point, means for introducing carbon dioxide into said liquid maintained in said bypass line, said means comprising a jet producing system which in turn comprises a driving jet nozzle connected to said bypass line, said bypass line having a low pressure chamber in fluid communication with a source of carbon dioxide, the cross sectional areas in said jet producing system being in the ratios: $f_1:f_2:f_M = 1:(0.2 \text{ to } 0.45):(1.3 \text{ to } 2.6)$, where f_1 is the cross sectional area of the outlet of said driving jet nozzle, f_2 refers to the induction channel inlet in the plane of said driving jet nozzle outlet and f_M is the bore area of a mixing tube which mixing tube is in fluid communication with the outlet of said driving jet nozzle said mixing tube being cylindrical and having a length equal to 24.5 to 30 times the internal diameter d_M of said mixing tube.

4,173,179

COOKING ASSEMBLY

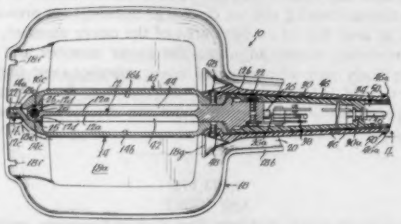
Richard P. Arthur, Darien, Ill., assignor to Sunbeam Corporation, Chicago, Ill.

Filed Oct. 5, 1977, Ser. No. 839,650

Int. Cl.² A47J *27/00*; H05B *1/00*

U.S. Cl. 99—374 **18 Claims**

1. A cooking device for fat-free grilling comprising a, rigid heating plate of heat conductive material defining a first flat heating surface, an outer plate, including a second flat heating surface, means for hingedly relating said outer plate and said heating plate to define a cooking chamber between said heating surfaces, a first handle extending from said heating plate, a second handle extending from said outer plate, means associated with the ends of said handles remote from said plates for holding said plates in position to define said cooking chamber,



an insulating drip tray, said drip tray including means for supporting said plates in a generally vertical plane, and electric heating means for heating said plates, the vertical orientation of said plates permitting grease to flow by gravity from said cooking chamber into said drip tray.

4,173,180

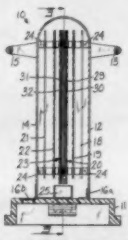
BACON COOKING APPARATUS

Peter M. Reiland, 27 8th Ave., Milford, Conn. 06460

Continuation-in-part of Ser. No. 859,085, Dec. 9, 1977, abandoned. This application Feb. 13, 1978, Ser. No. 877,337

Int. Cl.² A47J *37/06*

U.S. Cl. 99—391 **3 Claims**



1. Cooking apparatus comprising:

a base;

a first support member hingedly attached to said base and a second support member fixedly attached to said base;

each of said support members including heating means and integral means for supporting the food to be cooked, each of said food support means including an outer support means of fine mesh screen adapted to receive the food to be cooked and drain the drippings therefrom and an inner support means adapted to support said outer support means; and

a drip tray positioned to receive drippings from the cooking food.

4,173,181

KNOCK-DOWN PRESS

Donald J. Beneteau, 1333 Front Rd. South, Amherstburg, Ontario, Canada

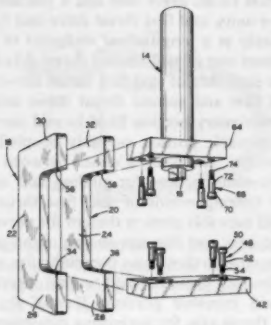
Filed Sep. 1, 1978, Ser. No. 938,858

Int. Cl.² B30B *1/32, 15/04*

U.S. Cl. 100—231 **10 Claims**

1. A fluid-operated press comprising two upright, generally C-shaped frame members, each including a vertically disposed web portion terminating in lower and upper horizontally disposed arms, a lower workpiece-supporting bar, lower fastener means affixing spaced portions of said workpiece-supporting bar to upper edges of said lower arms, a fluid-operated cylin-

der, a cylinder-supporting bar affixed to a lower portion of said cylinder, upper fastener means affixing spaced portions of said



cylinder-supporting bar to lower edges of said upper arms, said bars thereby positioning said generally C-shaped frame members in parallel, spaced relationship.

4,173,182

STAMPING MECHANISM FOR ROLLED GOODS WITH ARTICLE ALIGNMENT STRUCTURE

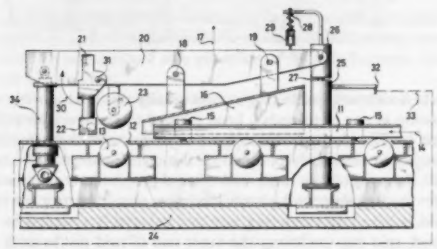
Johannes Balon, Dortmund, and Manfred Oldendorf, Iserlohn, both of Fed. Rep. of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Filed Oct. 17, 1977, Ser. No. 842,782

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1976, 2646560

Int. Cl.[2] B41F *17/00*

U.S. Cl. 101—4 **6 Claims**



1. A stamping device, especially for stamping rolled goods, while the goods are being transported over a roller train, which includes: a feeler device for feeling the goods to be stamped, an aligning device having said feeler device connected thereto, and a stamping head fastened to said aligning device, said aligning device being operable by said feeler device to align the goods to be stamped with said stamping head, said aligning device including: a longitudinal aligning arm having its longitudinal extension in the direction in which the goods to be stamped are to be moved toward said stamping head, and supporting means supporting said aligning arm for pivoting in a vertical plane and in a horizontal plane, thereby permitting conveying movements of said feeler device onto said aligning device for aligning the goods to be stamped with said stamping head.

4,173,183

LINE PRINTER CHARACTER BELT

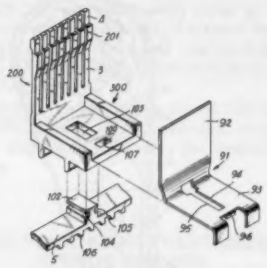
Hiroyuki Akazawa, Shiojiri, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo and Shinshu Seiki Kabushiki Kaisha, Nagano, both of, Japan

Continuation-in-part of Ser. No. 758,885, Jan. 12, 1977, abandoned. This application Mar. 10, 1978, Ser. No. 885,416

Claims priority, application Japan, Jan. 16, 1976, 51-4347

Int. Cl.[2] B41J *1/20*

U.S. Cl. 101—111 **5 Claims**



1. A line-printer character belt, comprising

(a) an endless belt having teeth on the inner surface thereof for engaging with toothed driving means and a boss on the outer surface thereof;

(b) an injection-molded character member attached to said belt and including a base portion and a finger portion making a dihedral angle of about 90° with each other, said base portion having an opening therein for receiving said boss, said finger portion including a plurality of flexible fingers each having a tip end and a character insert of hard, long-wearing metal in said tip end disposed outwardly from said base portion and a projection disposed inwardly toward said base portion;

(c) a retaining member having first and second segments making a dihedral angle, said retaining member being constructed and arranged for engaging said first segment thereof with said boss for holding said character member removably to said belt and for deflecting with its second segment said fingers uniformly outwardly from said base portion through engagement with said projection on each of said fingers, said engagement of said retainer member with each of said projections assuring uniform alignment of said fingers and the molded-in character insert therein, assuring controlled spacing between said fingers and the substrate on which printing is to be effected and providing for rapid damping of any vibration ensuing on a printing operation.

4,173,184

PRINT HEAD

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

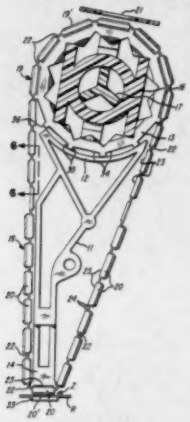
Filed May 14, 1975, Ser. No. 577,372

Int. Cl.[2] B41J *1/20*

U.S. Cl. 101—111 **10 Claims**

1. A print head, comprising: a frame having a stationary support, a plurality of rotatable wheels mounted by the frame, a plurality of printing bands received under tension about the support and the respective wheels, each printing band having a plurality of different printing elements and hinges connecting the printing elements, and spaced apart, smooth lugs on the undersides of the printing bands and there being a sufficient number of lugs at the underside of each band to enable any selected printing element to be brought to a printing zone by rotation of the respective wheel, there being a lug at the underside of each printing element, the lugs being of substantially equal length and each lug terminating at generally parallel end

faces, the support including a notch and a pair of support members having respective elongated lands, the lands having tapered entries and terminating at opposed shoulders which define the ends of the support notch, the support shoulders being generally parallel, the support lands being spaced apart to support only two adjacent hinges of a printing element while the intervening lug is received in the support notch between the support shoulders, the support notch being deeper than the lug thickness, the end faces of the lug at the printing



zone contacting the support shoulders, each wheel having a plurality of notches to receive the lugs, each wheel notch having a pair of shoulders spaced apart by a distance substantially equal to the length of a lug, each wheel having peripheral lands between the wheel notches for supporting only the hinges, each peripheral land having a peripheral dimension substantially equal to the spacing between adjacent lugs, the wheel shoulders being generally parallel, the wheel notches being deeper than the lug thickness.

4,173,185

SCREEN PRINTING APPARATUS

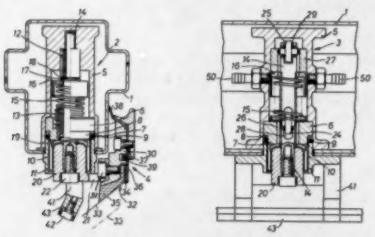
Heinrich Voegelin, Wiler b. Utzenstorf, Switzerland, assignor to Fritz Buser Ag. Maschinenfabrik, Switzerland

Filed Oct. 12, 1977, Ser. No. 841,479

Claims priority, application Switzerland, Oct. 19, 1976, 13240/76

Int. Cl.[2] B41F *15/42, 15/46*

U.S. Cl. 101—120 **9 Claims**



1. A squeegee structure for a screen stencil of a printing machine in which the material to be printed is moved along a feed axis comprising

a relatively stationary, elongated carrier frame having a longitudinal axis;

a first squeegee mounting means;

thrust drive means coupled to said carrier frame and said mounting means for moving said mounting means toward and away from a surface of a screen stencil and along a thrust axis which is perpendicular to the feed axis and said longitudinal axis, said thrust drive means comprising at least one first thrust drive unit and a plurality of second thrust drive units, said first thrust drive unit being located approximately at a longitudinal midpoint of said carrier frame, at least one of said second thrust drive units being located on each side of said first thrust drive unit;

each of said first and second thrust drive units having a relatively stationary portion fixed to said carrier frame, a relatively movable portion movably coupled to said stationary portions, and bearing means between said stationary and movable portions for guiding said movable portions; said bearing means of said first thrust drive unit guiding said movable portion thereof for movement along said thrust axis and for preventing movement of said movable portion in directions perpendicular to said thrust axis; said bearing means of said second thrust drive units guiding said movable portions thereof for movement along said thrust axis, for permitting movement in a direction perpendicular to said thrust axis and parallel to said longitudinal axis, and for preventing movement in a direction perpendicular to said thrust axis and said longitudinal axis; and

a first squeegee coupled to said mounting means;

whereby said first and second thrust drive units are flexibly coupled to compensate for deflection of said carrier member to avoid seizing of said first and second thrust drive units and provide uniform pressure along the entire length of the squeegee.

4,173,186

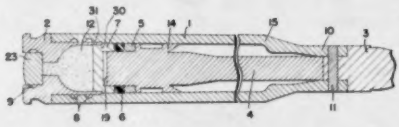
AMMUNITION

James V. Dunham, Jenkintown, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 7, 1960, Ser. No. 41,459

Int. Cl.[2] F42B *5/02, 9/00*

U.S. Cl. 102—38 R **10 Claims**



1. A cartridge including a substantially rigid extractable case having at one of its ends a head formed to receive a propellant and to provide a primer support adjacent to said propellant, a projectile releasably coupled to the other end of said case, a piston engaging an inner end of said projectile and extending into said casing, said piston having a shoulder near its inner end, a base cup extending into and releasably coupled to said head, said cup enclosing the inner end of said piston with said end spaced from the bottom of said cup, and seal means between the rim of said cup and said shoulder, a second shoulder on said piston in front of the first shoulder, and a shoulder in said case for cooperation with the second mentioned shoulder on said piston in deceleration and deformation of said piston.

4,173,187

MULTIPURPOSE PROTECTION SYSTEM

Bernard Steverding, Guntersville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

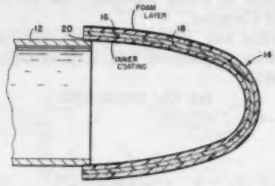
Filed Sep. 22, 1967, Ser. No. 670,524

Int. Cl.[2] F42B *11/00*

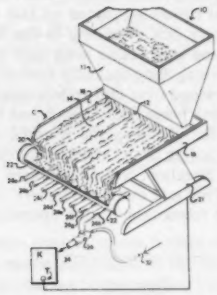
U.S. Cl. 102—105 **10 Claims**

1. A fused silica matrix shield for a missile structural shell and having incorporated therein at least two layers of radiation

absorbing particles, said layers including an inner layer and an outer layer of said particles, said particles comprising materials selected from the group consisting of refractory metals, carbides, borides, beryllides and nitrides, the atomic number of the metal component of said material of said inner layer being greater than the atomic number of the metal component of said material of said outer layer.



4,173,188
COAL FIRING SYSTEMS FOR KILNS
Philip D. Pearce, P.O. Box 272, Pleasant Garden, N.C. 27313
Filed Oct. 3, 1977, Ser. No. 838,825
Int. Cl.[2] F23K *3/02*
U.S. Cl. 110—106 **9 Claims**



1. A coal feeding system for mixing finely ground coal particles with air to form a combustible mixture of coal and air and deliverying said mixture to a plurality of furnace burners, said system comprising:

(a) a hopper for receiving and storing a supply of said coal particles;

(b) a feeder means including a plate having a front end and rear end with the rear end positioned below the outlet of said hopper, conveying means for evenly distributing the coal particles at a substantially consistent height across said plate and moving said particles toward the front end thereof;

(c) a metering housing including a trough having an open top and positioned below the front end of said plate for receiving coal particles as they drop therefrom;

(d) said trough having a plurality of spaced openings across the bottom thereof corresponding in number to the number of said burners;

(e) a plurality of coal particle intake pipes, each of said pipes extending transversely to said trough and immediately beneath one of said openings in said trough and having an opening in the top surface thereof corresponding in size and shape with and communicating with said opening in said trough with which it is associated;

(f) a mixing chamber having a means for introducing a flow of air thereinto, an exit end, and an opening in the top wall thereof into which one end of at least one of said coal particle intake pipes enters, the other end of said coal particle intake pipe being open to the atmosphere;

(g) a combustible mixture feed conduit leading from the exit end of said mixing chamber to the furnace;

(h) whereby coal dust and inspirated air are drawn through the intake pipe into the mixing chamber and delivered to the furnace.

9. A method of supplying coal to a plurality of furnace burners so as to maintain an even, controlled temperature within said furnace comprising the steps of:

(a) delivering a supply of coal sufficient for a plurality of burners to a metering housing;

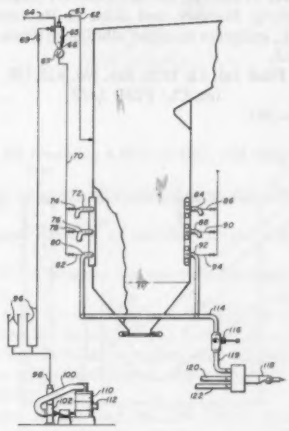
(b) dividing said supply of coal particles into a plurality of coal particle batches substantially equal in volume and equal in number to the number of furnace burners;

(c) introducing each batch of said coal particles at a controlled rate into a confined air stream to form a mixture of coal particles and air;

(d) delivering said mixture to one of said fuel burners;

(e) varying the quantity of coal delivered to the metering housing in step (a) responsive to the temperature within the furnace.

4,173,189
BOILER COLD START USING PULVERIZED COAL IN IGNITOR BURNERS
Thomas H. Cooper, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.
Continuation of Ser. No. 760,882, Jan. 21, 1977, abandoned. This application Dec. 29, 1977, Ser. No. 865,412
Int. Cl.[2] F23K *3/02*
U.S. Cl. 110—106 **26 Claims**



1. In a furnace system that includes a furnace, a main coal nozzle arranged to direct coal into the furnace, an air preheater having a flue-gas inlet, an air inlet, and an air outlet and being connected to receive flue gases from the furnace at its flue-gas inlet and transfer heat from the flue gas to air entering the air inlet and leaving the air outlet, a main pulverizer, conduit means connected to conduct coal from the pulverizer outlet to the main coal nozzle, means for forcing a first air stream through the preheater from its air inlet to its air outlet and from the air outlet through the pulverizer and into the main coal nozzle, and means for forcing a second air stream from the preheater outlet into the furnace, the improvement comprising:

a. an ignitor nozzle positioned for ignition of coal leaving the coal nozzle;

b. an ignitor pulverizer for pulverizing coal;

c. a separator for separating coal from air;

d. means for conveying coal mixed with air from the ignitor pulverizer to the separator;

e. means for conveying coal from the separator to the ignitor nozzle;

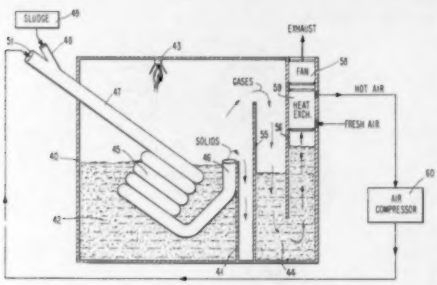
f. means for heating a third air stream to a temperature higher than that of the first and second air streams;
g. means for causing the third air stream to flow to the furnace at the ignitor nozzle; and
h. a lighter, positionable near the outlet of the ignitor nozzle, for igniting coal issuing from the ignitor nozzle.

6. In a method of operating a coal-fired furnace that includes heating a first air stream by transferring heat from combustion products of the furnace to the air in the first air stream, using the first air stream to entrain coal ground in a main pulverizer and convey it to the furnace, heating a second air stream by transferring heat from combustion products of the furnace to the air in the second air stream, and conducting it to the furnace, the improvement comprising steps of:
a. separating pulverized coal from a mixture of pulverized coal and air;
b. supplying the separated coal to an ignitor nozzle positioned to ignite the coal entrained in the first air stream as it enters the furnace;
c. heating a third air stream to a temperature higher than the temperature of both the first and second air streams;
d. causing the third air stream to flow to the furnace at the ignitor nozzle; and
e. igniting the coal leaving the ignitor nozzle.

4,173,190
SLUDGE INCINERATOR UTILIZING COILED CHANNEL IMMERSED IN MOLTEN SALT AND METHOD OF OXIDIZING SLUDGE UTILIZING SAME

Jacob Greenberg, Margate, and John E. Robertson, Cardiff, both of N.J., assignors to Anti-Pollution Systems, Inc., Pleasantville, N.J.

Filed Jul. 12, 1978, Ser. No. 923,720
Int. Cl.[2] F23G 5/12
U.S. Cl. 110—243 **12 Claims**

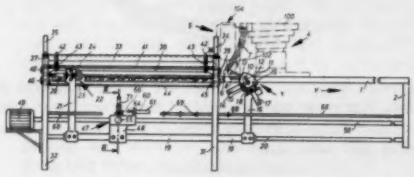


1. An incinerator for treatment of sludge and high water content matter, comprising:
a. a molten salt bath contained in a housing;
b. an enclosed channel made of a high heat transfer material, said channel being immersed in said bath whereby the interior of said channel is maintained at about the temperature of said bath;
c. temperature means for maintaining said bath at a temperature above the ignition temperature of solids contained in said sludge;
d. input means for inputting sludge and air into said channel;
e. output means for outputting effluent from said channel; and
f. pressure means communicating with said input means and said output means for providing a pressure between said input means and said output means, to move said air and sludge into said channel, wherein said sludge is dried and oxidized, and to move the products of the drying and oxidizing to said output means as effluent.

4,173,191
SEWING UNIT WITH SECTIONWISE SHIFTABLE CLAMPING DEVICE

Hermann Taddicken, Schwäbisch-Gmünd, Fed. Rep. of Germany, assignor to Eisele Apparate- und Gerätebau GmbH, Fed. Rep. of Germany

Filed Aug. 30, 1978, Ser. No. 937,976
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1977, 7727206[U]
Int. Cl.[2] D05B 3/00
U.S. Cl. 112—65 **14 Claims**



1. A device for feeding materials in a feed direction for operations on the materials, such as sewing, comprising, a support frame, a carriage mounted on said frame for movement backwardly and forwardly in respect to the feed direction of the material, a lower endless conveyor extending in a feed direction comprising longitudinal guide rollers and an endless belt trained over said rollers supported on said carriage, and upper endless conveyor belt extending in the feed direction and disposed over and cooperable with said lower endless conveyor and comprising longitudinally spaced guide rollers and an endless belt trained over said rollers supported on said carriage, biasing means biasing said upper and lower endless conveyors together for clamping the material therebetween along a considerable length of the material and for feeding the material in the feed direction, and drive means connected to said carriage for driving said carriage to move the material in predetermined timed relationship to the operations to be performed thereon.

4,173,192
ELECTROHYDRAULIC NEEDLE BAR POSITIONING APPARATUS FOR TUFTING MACHINES

Henry A. Schmidt, Elma, N.Y.; Larry P. Gable, Dalton, Ga., and Wallace W. Hammel, Jr., East Ridge, Tenn., assignors to Tuftco Corp., Chattanooga, Tenn.

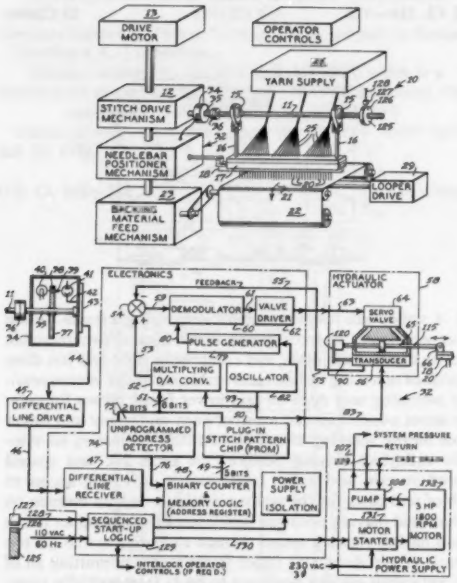
Filed Oct. 26, 1977, Ser. No. 845,826
Int. Cl.[2] D05C 15/30
U.S. Cl. 112—79 R **14 Claims**

1. In a tufting machine having a backing material support, means for feeding backing material longitudinally through the machine, a needle bar supporting a plurality of needles transversely of said machine, yarn supply means for feeding yarns to said needles, and means for reciprocating said needle bar to drive said needles into and out of the backing material upon the backing material support, a positioning apparatus for shifting transversely the needle positions relative to the backing material, comprising:
(a) a reciprocably movable, hydraulically driven actuator,
(b) coupling means connected to said actuator for changing the relative transverse positions of said needle bar and said backing material support in response to the relative position of said actuator,
(c) pressurized hydraulic fluid supply means for said actuator,
(d) valve means for controlling the flow of hydraulic fluid to said actuator,
(e) electronic pattern control means having input means and output means,
(f) said pattern control means comprising electronically programmed information corresponding to a stitch pattern predetermining the relative transverse positions of

said needle bar and said backing material support for each longitudinal needle stitch position,

(g) stitch sensor means communicating with said input means for producing an input signal for each needle stitch,

(h) said pattern control means also comprising means for producing programmed electrical output signals commensurate with said programmed information at said output means,



(i) said pattern control means further comprising electrical feedback means responsive to the actual position of said actuator producing corresponding feedback signals so that each of said output signals is conditioned by a corresponding feedback signal from said feedback means, and

(j) electrical valve control means responsive to the programmed electrical output signals from said output means for actuating said valve means to cause said actuator to move to a position corresponding to the value of each of said output signals.

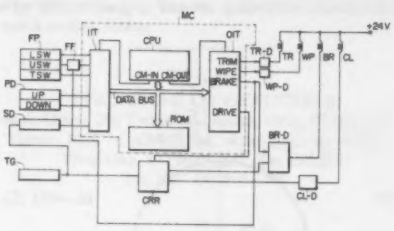
4,173,193

CONTROLLING APPARATUS FOR ELECTRIC SEWING MACHINE

Shigeki Morinaga; Takeo Maeda; Tadashi Takahashi, and Kosho Ishizaki, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 4, 1978, Ser. No. 866,835
Claims priority, application Japan, Jan. 14, 1977, 52-2405
Int. Cl.[2] D05B *69/26, 19/00*
U.S. Cl. 112—275 **7 Claims**

1. An apparatus for controlling an electric sewing machine comprising a motor, switch means providing control signals, clutch means for transmitting the driving torque of said motor to said sewing machine to drive the latter, braking means for selectively imparting a braking force to said sewing machine, means for detecting the position of the needle of said sewing machine and for generating a position signal at a desired position in its stroke, controlling means responsive to said control signals and said position signal for controlling said clutch means and said braking means to operate said sewing machine in accordance with a predetermined sequence, and clock means for controlling signal input and signal output to and



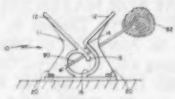
from said controlling means so that such signal transfer is effected only in synchronization with a clock signal.

4,173,194

MARINE CLEAT FOR RECEIVING A THROWN LINE

Charles S. McLaughlin, 181 Grove St., Cambridge, Mass. 02138

Filed Dec. 5, 1977, Ser. No. 857,118
Int. Cl.[2] B63B *21/04*
U.S. Cl. 114—218 **14 Claims**



1. A cleat for receiving a thrown line, said cleat comprising:

a body,

at least two upwardly diverging fingers extending from said body,

said fingers defining an opening for receiving a thrown line,

said body containing an aperture disposed below said fingers,

means for guiding a line from said opening into said aperture,

said means for guiding being formed in said body and extending from said opening near the bottom of said fingers where said fingers converge, downwardly into said aperture,

said means for guiding and said fingers cooperating to always direct into said aperture a line thrown between said fingers, and

projection means for preventing a line extending through said aperture from being pulled up into said means for guiding,

said projection means being disposed adjacent to the interface of said means for guiding and said aperture and extending downwardly into said aperture.

4,173,195

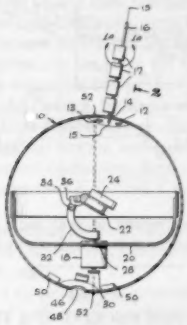
HYDRODYNAMIC CONFIGURATION FOR TOWED SUBMERSIBLE BODY

Calvin A. Gongwer, Glendora, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.

Filed Dec. 27, 1977, Ser. No. 864,570
Int. Cl.[2] B63B *21/56*
U.S. Cl. 114—244 **9 Claims**

1. A submersible body to be towed in the water from a suspending line comprising a hollow spherical housing having top and bottom ports to facilitate flooding of said housing, means attached to the top of said housing and fastened to said

line for suspending said body, ballast means in said housing near the bottom thereof for locating the wet center of gravity of said body significantly below its geometric center and a narrow projection extending around a great circle of said



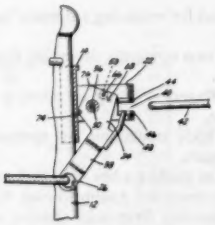
housing from approximately top to bottom and generally normal to the direction of tow to interrupt the flow around said body substantially uniformly around its periphery and to provide damping in yaw and pitch.

4,173,196

SAFETY RELEASE FOR WATER SKIING TOW LINE

Edward F. Casad, St. Marys; Thomas R. Casad, Celina, and Richard E. Jones, St. Marys, all of Ohio, assignors to Ajax Machine and Welding Co., St. Marys, Ohio

Filed Oct. 11, 1977, Ser. No. 840,585
Int. Cl.[2] B63B *21/56*
U.S. Cl. 114—253 **11 Claims**



1. A safety release for water skiing tow ropes comprising:

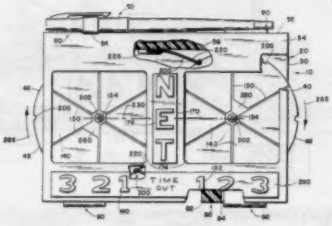
a body having spaced sides, each side having first and second opposite end portions, said first end portions being rigidly secured together, a lever disposed in substantial parallelism with and between said sides, said lever having an arm extending from between said sides and in a direction transversely of a longitudinal axis on said body which extends between said end portions, said second end portions of said sides having laterally registered slots opening therethrough defining a single slot which is substantially coplanar with said longitudinal axis, said lever being pivotally connected to said sides at a location substantially on said longitudinal axis so as to be swingable in substantial parallelism with said sides between first and second positions, bolt means disposed between in substantial parallelism with said sides and movable between a first position spanning and a second position clearing said slots, said bolt means in its first position extending transversely of said longitudinal axis, said lever having a connection with said bolt means to move the latter from its first to its second positions when said lever is moved from its first to its second positions, respectively, a rope-receiving clearance provided between said bolt means and the inner ends of said slots when said bolt means is in its first position.

4,173,197

VOLLEY BALL ROTATION COUNTER

Madylon C. Anker, Omaha, Nebr.

Filed Dec. 9, 1977, Ser. No. 859,082
Int. Cl.[2] A63B *71/06*
U.S. Cl. 116—223 **10 Claims**



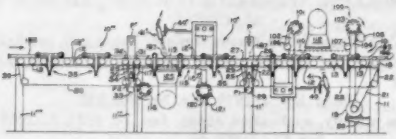
1. A volley ball rotation counter comprising a frame having upper and lower interconnected frame means, two rotatable discs alongside each other and comprising right and left discs capable of receiving visible removeable markings, means rotatably mounting said discs on said lower frame means for rotation about parallel spaced axes between said upper and lower frame means, marking means on said discs indicating six symbolic volleyball playing positions on each disc and spaced around its axis, said upper frame means providing access to each of said discs for the writing of player indicia thereon on each of said playing positions simultaneously, said upper frame means having viewing means thereon extending across the top of each of said discs, said upper frame means permitting all of said volleyball playing positions to be at least partially viewable simultaneously, a portion of the periphery of each of said discs extending beyond said upper frame means, means operably correlated with said discs and with said frame and with said mounting means for retarding rotation of said discs and yet permitting said discs to be rotated manually in a clockwise direction when an operator manually engages an edge of a disc to urge said disc into clockwise rotation.

4,173,198

TREAD END CEMENTER

Ronald E. Allen, Tuscaloosa, Ala., assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 25, 1977, Ser. No. 854,561
Int. Cl.[2] B05C *5/00, 15/00*
U.S. Cl. 118—706 **14 Claims**



1. A tread end cementer unit comprising a conveying unit operative to convey in a longitudinal direction along a tread pass line a tread having a leading and trailing end, a pair of spray means mounted on said conveying unit in longitudinal spaced direction, each spray means having a plurality of laterally spaced nozzles operative to spray said ends of said tread, one of said spray means mounted above said tread pass line for spraying cement downwardly onto one of said ends of said tread passing along said pass line on said conveying unit, the other of said spray means mounted below said tread pass line for spraying cement upwardly onto the remaining end of said

tread passing along said pass line on said conveying unit, and spray collector means mounted opposite each of said spray means on said conveying unit to collect overspray from said spray means.

4,173,199

APPARATUS FOR REINFORCING A FABRIC BY APPLYING A FLUID REINFORCING MATERIAL THERETO

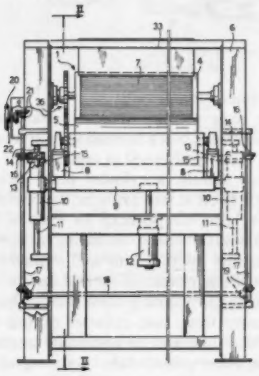
Cassiano Fassina, S. Mauro Torinese, Italy, assignor to Codama Holding S.A., Luxembourg

Division of Ser. No. 841,079, Oct. 11, 1977, which is a continuation of Ser. No. 635,544, Nov. 26, 1975, abandoned. This application Dec. 22, 1977, Ser. No. 863,563

Claims priority, application Italy, Dec. 2, 1974, 70493 A/74; Jul. 23, 1975, 68918 A/75

Int. Cl.[2] B05C *1/08*

U.S. Cl. 118—212 **6 Claims**



1. Apparatus for reinforcing a fabric by printing a pattern of discrete lines of fluid, settable or curable reinforcing material thereon, which reinforcing material is subsequently set or cured to form lines of an elastomeric or plastics material penetrated into and reinforcing said fabric, said apparatus comprising:

two printing roll means, first drive means for driving one of said printing roll means and second drive means for driving the other printing roll means continuously with said one of said printing roll means, said printing roll means comprising a rotary printing cylinder whose surface defines a printing pattern extending over substantially the entire circumference of the cylinder consisting of mutually parallel, non-interconnected axial grooves of a depth from 0.05 to 1 mm, and a backing roll for defining a printing zone with said printing cylinder;

movable mounting means mounting one of said printing roll means for translatory movement through a substantial distance towards and away from the other said printing roll means, whereby in one end position of said movable mounting means said printing roll means define said printing zone therebetween and in the other end position of said movable mounting means said printing roll means define a large gap through which said fabric can be drawn without printing said fluid reinforcing material thereon, enabling said fluid reinforcing material to be printed on at least one limited, discrete area of said fabric;

adjustable abutment means limiting said movement of said one printing roll means towards said other printing roll means to define a predetermined gap therebetween;

quick-acting means for rapidly moving said movable mounting means, and hence said one printing roll means, towards and away from said other printing roll means and holding said one printing roll means into engagement with said abutment means to maintain said gap constant during printing; and

stand means mounting said other printing roll means, said movable mounting means, said drive means and said quick-acting means.

4,173,200

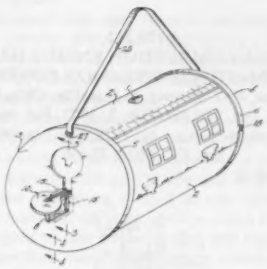
BIRDHOUSE CONSTRUCTION

Wayne A. Olsen, 250 Ewald SE., Salem, Oreg. 97302, and Calvin L. Tigner, 1035 N. Albany Rd., Albany, Oreg. 97321

Filed Dec. 12, 1977, Ser. No. 859,332

Int. Cl.[2] A01K *31/00*

U.S. Cl. 119—23 **3 Claims**



1. In a birdhouse of cylindrical shape closed by circular end walls, the improvement comprising,

an end wall of flexible construction,

a perch struck from said end wall and projecting outwardly therefrom along a fold line,

a perch support member subjacent the perch and in abutment with the end wall.

retainer means for said support member also struck from said end wall, and

said retainer means comprising a strip integral at its opposite ends with the end wall and said perch.

4,173,201

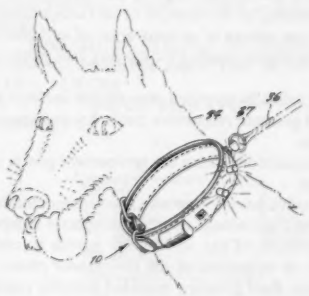
ILLUMINATED COLLAR FOR PETS AND THE LIKE

Ethel Chao, and Albert Chao, both of 407 Glendale Rd., Northvale, N.J. 07647

Filed Aug. 30, 1977, Ser. No. 829,181

Int. Cl.[2] A01K *27/00*

U.S. Cl. 119—106 **1 Claim**



1. An illuminated collar for pets and the like, comprising in combination, a leather strap, a rubber tape glued to one side thereof, forming a central core covered by a plastic facing on its outer side, and a plastic facing on its inner side and stitched together through said core; said collar including a self-contained illumination system that includes a plurality of lamps in

a row along said collar, which are in an electric circuit with a replaceable battery and a manually operative switch; a hard plastic battery case containing said battery, said lamps, switch and battery case protruding outwardly from an outer side of said collar, said battery case having an opening on its rear side for access to replace said battery, a rear edge of said battery case having a peripherally extending flange positioned behind said core, said battery case opening being covered by one end portion of said inner plastic facing which is left unstitched, thus forming a liftable tab for allowing said battery access, and said tab being retained closed over said case by means of VELCRO fasteners.

4,173,202

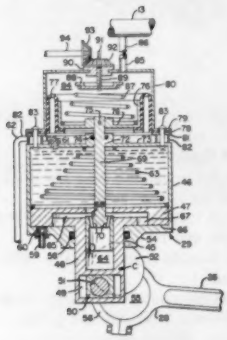
INTERNAL COMBUSTION ENGINE HAVING AUTOMATIC COMPRESSION CONTROL

George W. Crise, P.O. Drawer A, Danville, Ohio 43014

Division of Ser. No. 766,207, Feb. 7, 1977, Pat. No. 4,131,094. This application Nov. 20, 1978, Ser. No. 962,236

Int. Cl.[2] F02B *75/04*

U.S. Cl. 123—48 B **5 Claims**



1. In combination with a reciprocating piston-type internal combustion engine which includes a combustion cylinder, a fuel intake passage for conducting gaseous fuel to said cylinder, a piston reciprocable in said cylinder, a crankshaft, an articulated connecting rod comprising a plurality of angularly related, pivotally connected sections extending between and connecting said piston with said crankshaft, and a guide rod connected with said connecting rod and movable to vary the angular relationship of the sections of said connecting rod and thereby vary the pattern of reciprocation of said piston in said cylinder; an automatic control for moving said guide rod comprising:

(a) an hydraulically operated servomotor including a movable fluid pressure responsive piston having opposed pressure faces;

(b) crank means connecting the servomotor piston with said guide rod;

(c) a pilot valve having opposite faces connected by a fluid passage and movable in opposite directions independently of the position of the servomotor piston to control the direction of movement of the servomotor piston;

(d) a flexible, fluid pressure operated member continuously connected with said valve and the fuel intake passage of said engine and operable in response to pressure of a predetermined magnitude in said fuel intake passage to move said valve in one direction; and

(e) spring means engaging said flexible fluid pressure operated member and urging it to move in an opposite direction.

4,173,203

ENGINE SYSTEM

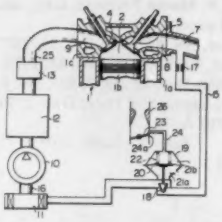
Yasuo Nakajima, Yokosuka; Michio Onoda, Yokohama; Kunihiko Sugihara, Tokyo, and Shinichi Nagumo, Yokohoma, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama Japan

Filed Dec. 1, 1977, Ser. No. 856,532

Claims priority, application Japan, Dec. 2, 1976, 51-145124

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **4 Claims**



1. An engine system comprising:

a four stroke reciprocatory internal combustion engine which has a cylinder block formed with at least one cylinder; a piston slidably disposed in said cylinder for reciprocal movement therein; a cylinder head secured to said cylinder block to close said cylinder, said cylinder, piston, and cylinder head cooperating to form a combustion chamber; an intake means, including a carburetor, for admitting air fuel mixture into said cylinder during the intake stroke of said piston; an exhaust means for discharging the exhaust gas resulting from the combustion of the air fuel mixture from said cylinder during the exhaust stroke of said piston; and an additional intake means for admitting air, under pressure above atmospheric pressure, into said cylinder during a period overlapping the exhaust stroke of said piston and during a period overlapping the intake stroke of said piston; and

an exhaust gas recirculation conduit leading from said exhaust means to said additional intake means to permit a portion of exhaust gas passing through said exhaust means to flow from said exhaust means toward said cylinder through said additional intake means.

4,173,204

CONTROL VALVE OF EXHAUST RECIRCULATION APPARATUS

Teruo Takayama; Kinsaku Yamada, and Chiaki Niida, all of Katuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 14, 1977, Ser. No. 851,429

Claims priority, application Japan, Nov. 17, 1976, 51-138777

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **10 Claims**

1. A control valve for an exhaust recirculation apparatus of an internal combustion engine, which controls an exhaust gas recirculation valve provided in an exhaust recirculation passage which leads exhaust gas from the engine back to the engine for controlling the quantity of exhaust gas recirculated in the exhaust recirculation passage according to the degree of vacuum at a venturi portion of a carburetor and the exhaust pressure in an exhaust inflow chamber defined in the exhaust recirculation passage by an orifice and the exhaust gas recirculation valve, comprising:

an expansible vacuum chamber having a first diaphragm and communicating with said venturi portion of a carburetor;

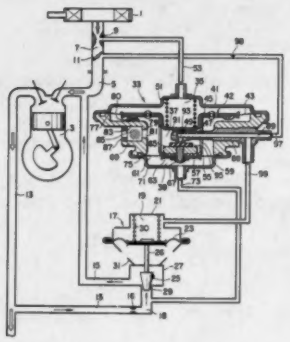
an expansible exhaust pressure chamber having a second diaphragm arranged such that the second diaphragm opposes the first diaphragm of the expansible vacuum chamber and is spaced therefrom, the expansible exhaust

pressure chamber communicating with said exhaust inflow chamber;

a control chamber defined by the first diaphragm, the second diaphragm, and a frame mounting the first and second diaphragm thereon, the control chamber communicating with atmosphere through a hole in the frame;

connecting means for mechanically connecting the first diaphragm and the second diaphragm;

a seal member provided in said control chamber so as to move with said connecting means;



a control passage disposed in the control chamber and communicating with a throttle portion of the carburetor and with said exhaust gas recirculation valve, and having an opening in said control chamber which faces said seal member and is spaced therefrom so that said opening is throttled by movement of said seal member with respect thereto; and

a spring urging said first diaphragm in a direction such that the gap between said seal member and said opening of the control passage will be increased.

4,173,205

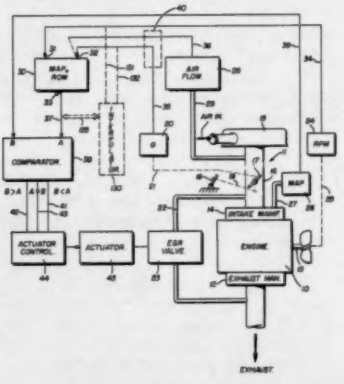
CLOSED LOOP EXHAUST GAS RECIRCULATION SYSTEM

Alvin D. Toelle, Fenton, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Nov. 28, 1977, Ser. No. 855,493

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 A **11 Claims**



1. In an internal combustion engine having an intake system, an exhaust system, a throttle for controlling the air flow into said intake system, and an output shaft rotatably driven by the combustion of fuel and air in said engine, a closed loop exhaust gas recirculation system comprising:

a memory means for storing a look-up table of optimal values of absolute manifold pressure (MAP_O) as a function of engine speed and throttle position a unique one of said stored optimal values of absolute manifold pressure being defined for each memory location and each memory location being accessible by the entry of a first dimension address and a second dimension address for outputting the optimal value of absolute manifold pressure stored therein;

means associated with said engine and responsive to the rotation of said output shaft for generating a first digital number indicative of actual engine speed for addressing one of said first and second address dimensions of said memory means;

means associated with said throttle and responsive to the relative position thereof for generating a second digital number indicative of the actual throttle position for addressing the other of said first and second address dimensions of said memory means;

said memory means being responsive to the generation of said first and second digital numbers for addressing said first and second memory dimensions to access said unique memory location defined thereby and output a third digital number indicative of said unique optimal value of absolute manifold pressure MAP_O stored therein;

means coupled to said intake system and responsive to the actual absolute manifold pressure existing therein for generating a fourth digital number indicative of the actual absolute manifold pressure (MAP);

means for comparing said third and fourth digital numbers and generating a first control signal if $MAP < MAP_O$ and for generating a second control signal if $MAP > MAP_O$;

a conduit operatively coupling said exhaust supply to said intake supply for supplying said exhaust gases to said intake system for inhibiting the generation and emission of oxides of nitrogen while regulating drivability and the like;

valve means disposed at least partially within said conduit for regulating the flow of exhaust gases back to said intake system; and

control means for regulating the opening and closing of said valve means and responsive to said first control signal for increasing the amount of recirculated exhaust gases supplied to said intake system and responsive to said second control signal for decreasing the amount of recirculated exhaust gases supplied to said intake system.

4,173,206

ELECTROSTATIC FUEL INJECTOR

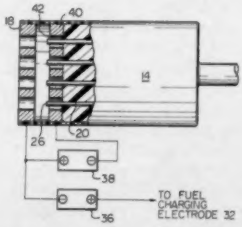
Kenji Masaki, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Mar. 18, 1977, Ser. No. 778,944

Claims priority, application Japan, Mar. 24, 1976, 51/31450; May 29, 1976, 51/61785

Int. Cl.[2] F02B *33/00*

U.S. Cl. 123—119 E **5 Claims**



1. A fuel ejection unit for combustion systems comprising:

charging and ejecting means for electrically charging a volume of fuel to a given polarity and having ejecting means for ejecting same;

first electrode means electrically charged in use to a polarity opposite to said given polarity to establish an electrostatic field which accelerates the ejected fuel; and

second electrode means spaced from said first electrode means adjacent to a point where said fuel is ejected and electrically charged in use with respect to said first electrode means for modifying said electrostatic field to thereby control the amount of said juel ejected.

4,173,207

CANISTER

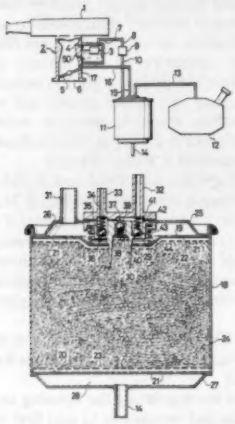
Eiji Hiramatsu, Aichi, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation of Ser. No. 697,848, Jun. 21, 1976, abandoned. This application Mar. 22, 1978, Ser. No. 889,112

Claims priority, application Japan, Jan. 14, 1976, 51-2784

Int. Cl.[2] F02M *37/02*

U.S. Cl. 123—136 **1 Claim**



1. A canister for an internal combustion engine having a carburetor that includes a float chamber (3) and a purge port (17) positioned adjacent a throttle valve (5) and a fuel tank (12), said canister comprising:

a hollow, main body (18) having a space therein;

an adsorbent material (24) partially filling said space in said main body and defining upper and lower spaces (26 and 28, respectively) in combination with said main body;

a first inlet pipe (31) attached to said main body (18) for permitting passage of fuel evaporation gases from the float chamber (3) of the carburetor (2) to said upper space (26);

an air suction pipe (14) attached to said main body (18) whereby said lower space (28) communicates with the atmosphere through said suction pipe; and

valve means (37, 41 and 36) separate from said first inlet pipe (31) for providing selected fluid communication between both the fuel tank (12) and said upper space as well as the purge port (17) and said upper space, said valve means comprising;

a valve casing (29) positioned in said housing and having a tubular partition (30) extending downwardly therefrom into said adsorbent material (24);

a first, positive pressure ball-type check valve (37) in said valve casing and in fluid communication with said upper space (26);

a second inlet pipe (32) fluidly connecting the fuel tank (12) to said first check valve (37) and to said upper space (26);

a second, negative pressure ball-type check valve (41) in said valve casing and in fluid communication with said upper space (26);

said second inlet pipe (32) also providing fluid communication between said second check valve (41) and the fuel tank (12), said second check valve (41) acting only when the pressure in the fuel tank (12) is negative;

a third ball-type check valve (36) in said valve casing and in fluid communication with said upper space (26);

an outlet pipe (33) fluidly coupling the purge port (17) and said third check valve (36) for preventing the fuel evaporation gas from flowing back from the carburetor (2) into said upper space (26).

4,173,208

FUEL SYSTEMS FOR AN INTERNAL COMBUSTION ENGINE

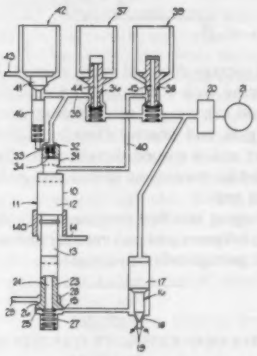
Ivor Fenne, Greenford, and Boaz A. Jarrett, London, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Nov. 7, 1977, Ser. No. 848,999

Claims priority, application United Kingdom, Nov. 9, 1976, 46677/76

Int. Cl.[2] F02D *5/02*

U.S. Cl. 123—139 AT **10 Claims**



1. A fuel system for connection to a fuel injection nozzle of an internal combustion engine, comprising a first cylinder having a first outlet, first piston means movable within said first cylinder to displace fuel at high pressure from one end of said first cylinder through said outlet to a fuel injection nozzle, a second cylinder having a second outlet, second piston means movable within said second cylinder to displace a limited volume of fluid at pressure from one end of said second cylinder through said second outlet, passage means connecting said second outlet to said first cylinder, and valve means having means operably connecting said first and second cylinders and adapted to supply, in a first condition, fluid under pressure to said second piston means for moving said second piston means towards said one end of the second cylinder so as to displace fluid at pressure therefrom, and also said fluid at pressure displaced from said one end of the second cylinder to said first cylinder to be applied to said first piston means through said passage means, for moving said first piston means towards said one end of the first cylinder so as to displace a limited volume of fuel through said first outlet, said means operably connecting said first and second cylinders being adapted to apply in a second condition, fluid at pressure to said first piston means, whereby said first piston means is moved towards said one end of the first cylinder so as to displace fuel through said first outlet, and said means operably connecting said first and second cylinders enabling, in a third condition, said first piston means to be moved away from said one end of the first cylinder, and also enabling in one of said second and third condi-

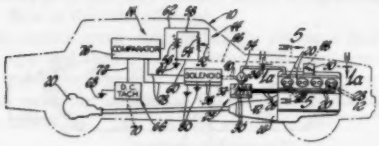
tions, said second piston means to be moved away from said one end of the second cylinder.

4,173,209

ENGINE CONTROL SYSTEM AND VALVE DEACTIVATOR THEREOF

Edgar R. Jordan, 32260 W. Twelve Mile Rd., Farmington Hills, Mich. 48018

Division of Ser. No. 815,743, Jul. 14, 1977. This application Dec. 16, 1977, Ser. No. 861,377
Int. Cl.[2] F02D *13/06*
U.S. Cl. 123—198 F **6 Claims**



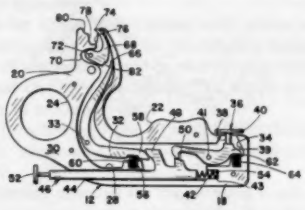
1. In an internal combustion engine that is throttle operated to control output speed and which includes a plurality of piston cylinders with respective intake and exhaust valves associated therewith for feeding combustible charges to the cylinders and for receiving burnt charges therefrom, an engine control system comprising: valve deactivators associated with the intake and exhaust valves of certain cylinders to control operation thereof; each deactivator having a member movable to a first position where the associated valve operates and to a second position where the associated valve is deactivated; a first sensor for generating a variable signal responsive to engine throttle position; a second sensor for generating a variable second signal responsive to engine output speed; a comparator that compares the signals of the first and second sensors and generates a variable output signal responsive thereto; and actuator means for controlling the valve deactivators in response to the output signal of the comparator such that the movable member of each intake valve deactivator is moved to the first position thereof after the movable member of the associated exhaust valve deactivator is moved to the first position thereof and such that the movable member of each exhaust valve deactivator is moved to the second position thereof after the movable member of the associated intake valve deactivator is moved to the second position thereof.

4,173,210

BOW STRING RELEASE DEVICE

Loyd S. Napier, Rte. 1, Box 417A, Sapulpa, Okla. 74066

Continuation-in-part of Ser. No. 684,114, May 7, 1976, Pat. No. 4,066,060. This application Dec. 29, 1977, Ser. No. 865,626
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—35 A **3 Claims**



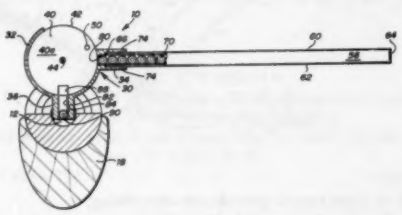
1. A draw and release device for a bow string and comprising a generally L-shaped body means contoured for gripping by a hand and having a substantially co-extensive L-shaped internal passageway means with an open end for receiving a bow string, latch means alternately engageable and releasable with respect to a bow string, a first pivotal bell crank means disposed within said passageway means for movement between latch means engaging and releasing positions, independent trigger means carried by said body means and operably connected with said first bell crank means for selective pivoting of said first bell crank means to pivot said first bell crank means so as to release said latch means from a bow string engaging position, said latch means being pivotally secured within said body means and in communication with said passageway means for selective engagement by said first bell crank means, flexible loop means secured to said body means for selective engagement with a bow string, loop receiving recess means provided on the outer periphery of said body means for removably receiving said loop means therein, said latch means extending transversely across said loop receiving recess means and being selectively engageable therewith for alternate opening and closing thereof to alternately retain and release said loop means with respect to said loop receiving recess means, said trigger means comprising lever means movably secured in said passageway means selectively engageable with said first bell crank means for providing said release of the latch means, and second bell crank means pivotally secured in said passageway means for selective engagement with the movable lever means to control the engagement of the lever means with the said first bell crank means for providing said release of the latch means.

4,173,211

PELLET GUN LOADING DEVICE

Tom H. Crawford, Jr., 408 S. Waverly St., Dallas, Tex. 75208

Filed Dec. 29, 1977, Ser. No. 865,441
Int. Cl.[2] F41F *9/06*
U.S. Cl. 124—45 **4 Claims**



1. A dispensing device for loading pellets into the receiver of an air gun comprising:

a circular housing having curvilinear wall portions, said wall portions including a pellet receiving aperture and a circumferentially disposed pellet dispensing aperture for mating and communicating with the receiver of the air gun;

an elongated hollow storage tube having top, bottom and side walls for retaining and storing a plurality of pellets in a predetermined orientation, one end thereof being open for removably mating to said housing adjacent said pellet receiving aperture to permit pellets retained and stored in said storage tube to enter said housing;

said bottom wall of said storage tube having an interior surface including a centrally disposed rib for maintaining said plurality of pellets in said predetermined orientation;

a pellet dispensing wheel having a peripheral surface and parallel side wall surfaces rotatably disposed within said housing for circular movement therein, a portion of said peripheral surface of said pellet dispensing wheel being exposed through said housing curvilinear wall portions to permit an operator to rotate said pellet dispensing wheel within said housing;

said peripheral surface of said pellet dispensing wheel including a longitudinal slot perpendicularly disposed to said side wall surfaces of said pellet dispensing wheel, said longitudinal slot opening outwardly of said pellet dispensing wheel and being dimensioned for retaining one of said plurality of pellets retained and stored in said storage tube;

said housing further including a shaft aligned with said pellet dispensing aperture for mating with the receiver of the air gun; and

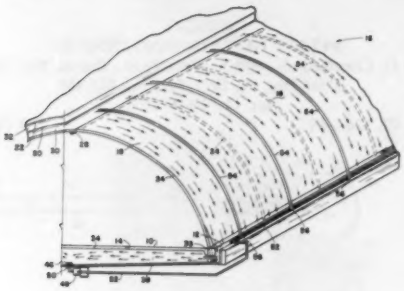
said pellet dispensing wheel being rotatable within said housing between a first position in which said longitudinal slot is aligned with said pellet receiving aperture for receiving one of said plurality of pellets retained and stored in said storage tube and a second position in which said longitudinal slot is aligned with said pellet dispensing aperture for dispensing said received pellet through said housing shaft for insertion in a predetermined orientation into the receiver of the air gun while simultaneously preventing the remaining ones of said plurality of pellets retained and stored in said storage tube from entering said housing until a subsequent loading of the air gun.

4,173,212

SELF-CONTAINED SOLAR GREENHOUSE

Carl E. Whitcomb, Stillwater, Okla., assignor to The Board of Regents for the Oklahoma Agricultural and Mechanical Colleges, Stillwater, Okla.

Filed Oct. 17, 1977, Ser. No. 842,666
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—430 **9 Claims**



1. A solar heated greenhouse comprising;

a floor having parallel sides;

a quonset type roof structure supported above said floor, the roof extending to the floor sides, the roof being formed of inner and outer spaced apart light penetratable members providing a heat collecting chamber therebetween;

a water filled strata beneath said floor and in heat conductive relationship therewith, the strata having communication with said roof heat collecting chamber at the floor edges, the strata having a base surface, the longitudinal median portion of said base surface being at a lower level than the longitudinal edges of said lower base;

an impervious lining provided between said lower base and the earth;

means for spraying water in said heat collecting chamber between said light penetratable members whereby water heated by solar energy runs down the chamber and into said strata;

pump means for circulating water from said strata into said heat collecting chamber whereby water in said strata is heated during sunlit hours, the heat of the water in the strata penetrating said floor and maintaining a warm temperature within the greenhouse at night and during cloudy days, said pump means comprising a pump having an inlet and outlet, pipe means connected between said pump inlet and the longitudinal median portion of said lower base, a distribution conduit connected to said pump outlet and extending along at least one side of said floor, and a plurality of hoses each having spaced openings therein, the hoses being positioned in spaced apart orientation in said heat roof collecting chamber, each said hose being connected to said distribution conduit; and

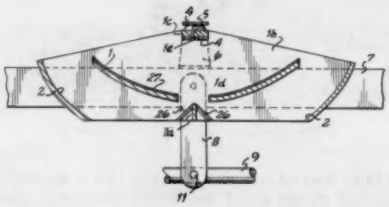
the water filled strata and said heat collecting chamber together with said pump means forming a closed system.

4,173,213

SOLAR POWER SYSTEM, WITH HIGH CONCENTRATION, LINEAR REFLECTIVE SOLAR PANELS

Donald A. Kelly, 58-06 69th Pl., Maspeth, N.Y. 11378

Filed Sep. 15, 1976, Ser. No. 723,501
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—425 **8 Claims**



1. A solar power system with multiple high concentration reflective solar panels formed of linear parabolic reflectors with mirrored surfaces,

each of said multiple high concentration reflective solar panels is reinforced with a longitudinal support strip and stringer with cross partitions at uniformly spaced intervals,

two lower side concave elongate mirrors secured to said cross partitions at uniformly spaced intervals,

two lower angular mirrors centrally secured to said longitudinal stringer,

centrally disposed longitudinal slots within said high concentration reflective solar panels between said cross partitions,

a continuous line of photovoltaic solar cells affixed to the underside of said longitudinal support strip,

end pivots located at the ends of said multiple high concentration reflective solar panels centered on the focal line of said linear parabolic reflectors,

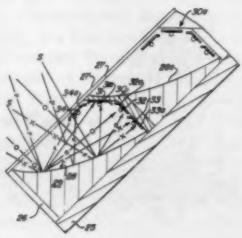
each of said end pivots fitted into trunnion brackets secured to an open rigid framework with suitable hardware.

4,173,214

CONCENTRATING SOLAR HEAT COLLECTOR

Arthur P. Fattor, 5380 S. Holly, Englewood, Colo. 80110

Filed Aug. 15, 1977, Ser. No. 824,569
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—441 **8 Claims**



1. A non tracking and non tilting concentrating solar radiation collector system of the reflecting type, comprising:

(a) at least one parabolic—trough reflecting surface mounted one generally above the other, and at an angle to collect solar radiation, at sun angles from about 30° to 75° above

the horizon which reflect incoming rays generally upright into a line focus, which moves horizontally with a change in the suns angle,

(b) a plurality of separate, spaced apart target means shielded from each other and superposed over each said reflecting surface, and each target positioned to be impinged by said line focus at predetermined times of the year,

(c) each said target means having solar heat collection means over a predetermined distance related to the suns angle to be impinged on by radiation during a predetermined calendar period having attached fluid conveying conduit means in heat transfer contact with said collection means, and each said fluid conduit means being arranged for a flow of fluid therethrough,

(d) control means for individually passing a fluid through one said fluid conduit means while the remainder are closed to fluid flow, and

(e) means for circulating fluid through said fluid conduit means.

4,173,215

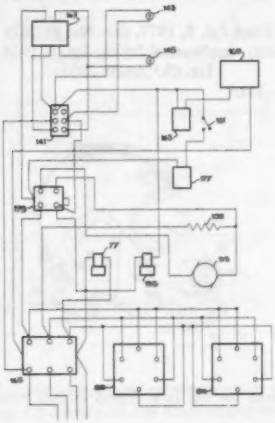
APPARATUS FOR STEAMING FOODS

Jean Y. Bureau, Dollard-des-Ormeaux, and Bernard Charlebois, Montreal, both of Canada, assignors to Mscan Metal Canada Limitee, Montreal, Canada

Continuation of Ser. No. 857,683, Dec. 5, 1977, abandoned. This application Jul. 28, 1978, Ser. No. 928,906

Int. Cl.[2] A21B *1/08*; A47J *27/04*

U.S. Cl. 126—369 **19 Claims**



1. An apparatus for steaming foods comprising:

(a) a steam chamber;

(b) means for filling the chamber with steam, said filling means comprising means for introducing liquid into the bottom of the steam chamber, and heating means outside the steam chamber for heating the liquid in the steam chamber to produce steam;

(c) means for allowing steam to escape from the chamber to maintain substantially atmospheric conditions in the chamber;

(d) a condensing chamber for the escaping steam;

(e) means in the condensing chamber for spraying liquid on the steam to condense it;

(f) means for draining the liquid and condensed steam from the condensing chamber; and

(g) means for controlling the heating means and the filling means, said control means comprising a sensor for sensing the temperature of the water and condensed steam in the condensing chamber.

4,173,216

MASSAGE DEVICE

Roland Nolet, 14 Belle Pl., Ste-Rose, Laval, Quebec, Canada (H7L 3G9)

Filed Jan. 21, 1977, Ser. No. 761,345

Int. Cl.[2] A61H *29/00*

U.S. Cl. 128—24.1 **1 Claim**

1. A massage device for massaging the bottoms of the feet and the palms of the hands of a user on a supporting surface, said massage device comprising

carpet having an upper surface and bumps formed therein and extending from the upper surface thereof, said carpet covering the supporting surface and coming into close contact with the bottoms of the feet or the palm of the hands of a user; and

a pipe on the supporting surface under the carpet and having water circulating therethrough.

4,173,217

MASSAGE APPARATUS

Lyman C. Johnston, 12 Boulton Dr., Toronto, Ontario, Canada

Filed Nov. 23, 1976, Ser. No. 744,385

Claims priority, application Canada, Jul. 18, 1976, 256590

Int. Cl.[2] A61H *29/00*

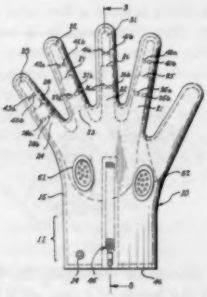
U.S. Cl. 128—734 **1 Claim**

1. A method of massage treatment of deep muscle in body tissue comprising the steps of attaching to the skin of the person being treated a pair of electrodes of a galvanic skin reactor to complete the circuit, applying to said body tissue reciprocating massage elements intended to to cause muscular stretch reflex to affected muscles, which reflex will change the resistance between said pair of electrodes and the underlying skin and measuring the response of said galvanic skin reactor indicating the change in resistance between said electrodes and the enclosed skin caused by said application of said massage elements to said body tissue.

4,173,218
GLOVED SPLINT FOR AN ARTHRITIC HAND

Penny S. Cronin, 7831 W. Zucca Dr., Peoria, Ariz. 85345

Filed Nov. 23, 1977, Ser. No. 854,130
Int. Cl.[2] A61F 5/10
U.S. Cl. 128—77 11 Claims



1. A hand protector for supporting and protecting the fingers of an arthritis stricken hand, said hand protector . . . comprising in combination:

(a) a palm splint positionable in juxtaposed relationship to the palm of the hand, said palm splint being configured to permit unrestricted normal movement of the thumb;

(b) a finger splint extending from said palm splint for supporting each respective finger but not thumb in a non-laterally moveable relationship to the palm;

(c) means for flexing a section of at least one of said finger splints to permit flexing of the fingers along a single axis only to control opening and closing of the fingers of the hand, said flexing means being positionally commensurate with a joint of the respective finger; and

(d) glove means for maintaining said palm splint and said finger splints in juxtaposed relationship with the respective parts of the hand while enclosing at least the fingers and palm of the hand, said glove means including:

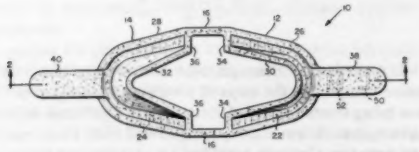
i. shock absorbing means for buffering impacts and blows to the hand; and

ii. means for opening and closing said glove means to facilitate insertion and withdrawal of the hand therefrom, whereby, said finger splints preclude lateral skewing of the fingers due to involuntary muscle contractions and yet permit mobility of the thumb and mobility of the fingers to flex.

4,173,219
DISPOSABLE DENTAL TRAY

Frank N. Lentine, Taylor, Mich., assignor to Sybron Corporation, Rochester, N.Y.

Filed Jan. 30, 1978, Ser. No. 873,269
Int. Cl.[2] A61M 35/00
U.S. Cl. 128—260 5 Claims



1. A dental tray for applying medicaments and the like to teeth comprising:

(a) an upper tray portion for the upper dentition and a lower tray portion for the lower dentition;

(b) each of said tray portions including an outer shell of closed cell polyethylene foam, said outer shell having a generally U-shaped base approximating the curve of the dental arch and integrally formed buccal, lingual and rear walls upstanding from said base so as to form a closed medicament holding trough;

(c) said base being flat in cross section from the posterior ends of said U-shape to the bicuspid region and concave from the bicuspid region to the anterior end;

(d) said buccal wall being generally normal to said base from the anterior to the posterior ends;

(e) said lingual wall being generally normal to said base at the posterior ends and inclined with respect to said base in a direction away form said buccal wall at the anterior end, the angle of inclination of said upper tray lingual wall being greater than the angle of inclination of said lower tray lingual wall;

(f) said buccal and lingual walls being lower at the posterior than at the anterior ends so as to form a trough which increases in depth from the posterior to anterior ends;

(g) hinge members extending between and connected to the posterior ends of said tray portions connecting said tray portions together;

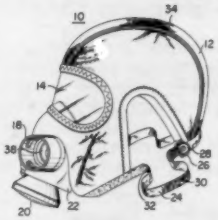
(h) a layer of open cell polyurethane hydrophillic foam bonded to and lining the entire inner surface of said tray portions;

(i) a handle extending outwardly from the upper edge of each buccal wall at the anterior end thereof.

4,173,220
FACEMASK

Thomas J. Ratz, Greenbelt, and Ralph L. Baker, Baltimore, both of Md., assignors to Midori Anzen Company, Ltd., Tokyo, Japan

Filed Jul. 5, 1977, Ser. No. 812,629
Claims priority, application Japan, Jul. 5, 1976, 51-88225
Int. Cl.[2] A62B 7/00
U.S. Cl. 128—142.7 2 Claims



1. A facemask for use in a closed circuit breathing system comprising:

a soft, flexible hood for closely covering the head of a user and having a cut-away portion at opposite side positions corresponding to the user's ears for exposing the user's ears when the facemask is worn;

a transparent flexible eye piece secured to said hood for allowing the user to see therethrough, said eye piece being substantially flush with the hood for forming a continuous, low profile contour with said hood;

a breathing mask secured to said hood and including means adapted to hermetically envelope the mouth and the nostrils of the user when the facemask is worn by the user for forming a closed breathing chamber between said breathing mask and the facial skin of the user, said breathing mask having means for connecting breathing hoses to said breathing mask for directly flow of breathing gas directly into and out of said breathing mask, a voice disc on said breathing mask for allowing voice communications by the user, and check valve means in said means for connecting breathing hoses for regulating the direction of flow of the inhalation and exhalation gases to and from said breathing chamber; and

supporting means constituting part of said hood for firmly supporting said breathing mask on the oro-nasal portion of the user's face and constituted by inelastic straps integrally attached to said hood and extending across the top and down the back of said hood, and inelastic adjusting bands connected across said cut-away portion of said hood adjacent the lower edges of said hood and means for adjusting said bands to adjustably secure the hood to the head of a user.

4,173,221

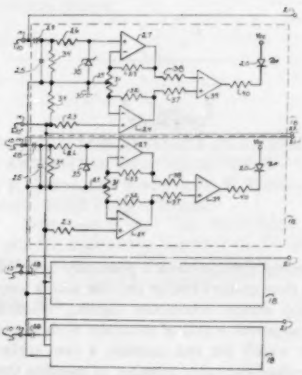
EKG CABLE MONITORING SYSTEM

Richard J. McLaughlin, Hawthorne, Calif., and Wallace J. Rogozinski, 26 Dragonfly, Irvine, Calif. 92714, assignors to Wallace Rogozinski, Irvine, Calif.

Continuation-in-part of Ser. No. 787,976, Apr. 15, 1977, abandoned. This application Jun. 30, 1978, Ser. No. 920,740

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—696 **8 Claims**



1. An EKG cable monitoring system for use with a cable assembly having a plurality of test leads connected to a cable connector for a multiconductor cable to an EKG unit and including at least one reference lead and a plurality of signal leads connected to electrodes electrically coupled to the skin of a patient, said system comprising:

a visual display including a plurality of display devices, each electrically coupled to an associated signal lead and mounted on said cable connector in positional association with the signal lead to which it is coupled; and

separate display drive means coupled across each signal lead and a reference lead, each drive means comprising a pair of primary differential amplifiers, the combined outputs of which are connected to drive a single one of said display devices, wherein a single one of each of said signal leads is coupled to a single one of said drive means, and therein coupled to a first polarity iput of a first one of said pair of primary differential amplifiers and said reference lead is connected to the first polarity input of the second one of said pair of primary differential amplifiers, and the opposite polarity inputs to said differential amplifiers are connected to a common floating ground.

4,173,222

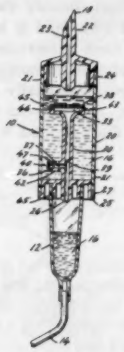
APPARATUS FOR CONTROLLABLY ADMINISTERING A PARENTERAL FLUID

Andrew J. Muetterties, Gages Lake, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 19, 1976, Ser. No. 715,810

Int. Cl.[2] A61M *5/16*

U.S. Cl. 128—214 C **31 Claims**



1. An apparatus for administering a parenteral liquid from a parenteral liquid container to the patient comprising:

a reservoir chamber;

connection means for said fluid container in fluid-tight engagement with one end of said chamber, said connection means defining a fluid flow inlet passageway into said chamber;

means defining a closure for another end of said chamber, said closure means providing for a fluid flow outlet passageway;

fluid passage means extending into said chamber and in communication with said fluid flow inlet and outlet passageways;

means disposed in said chamber defining a first and a second orifice in communication with said fluid flow outlet passageway with at least one of said orifices communicating with said fluid passage means, said first and second orifices spaced from each other a predetermined distance and separately communicating with said outlet passageway;

means operatively associated with said first and second orifices and within said reservoir chamber to provide a reservoir of said liquid for flow through said second orifice after flow of said liquid through said first orifice and to substantially eliminate the flow of air into said first orifice; and

means operatively associated with said outlet passageway for administering said liquid.

4,173,223

CHAMBER ASSEMBLY FOR INFUSION AND TRANSFUSION APPARATUS

Kenneth C. Raines, and Robert J. LeFevre, both of Bethlehem, Pa., assignors to National Patent Development Corporation, New York, N.Y.

Filed Oct. 17, 1977, Ser. No. 843,064

Int. Cl.[2] A61M *5/16*

U.S. Cl. 128—214 C **11 Claims**

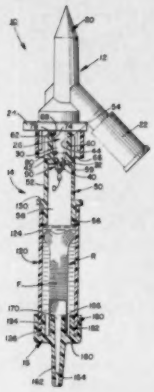
1. A connecting apparatus for use with infusion and transfusion systems comprising:

a piercing device assembly for connection to a source of fluid;

a tubing adaptor for connection to a length of tubing; and

a drip chamber assembly connecting said piercing device assembly to said tubing adaptor, said drip chamber including an observation chamber having port means located at

one end thereof through which fluid passes from said piercing device directly into said drip chamber, said observation chamber being attached to said piercing device assembly at said one end to form a joint and having defined therein an observation chamber passage through which fluid from the source of fluid passes directly from said source, a flexible pump chamber attached to one end thereof directly to another end of said observation chamber and receiving fluid directly therefrom, said pump chamber being filled with fluid at least and only to the level of said joint to form a reservoir from which fluid is removed during an infusion or transfusion procedure, said reservoir being located essentially entirely below said observation chamber, the removed fluid being replaced from the source of fluid as fluid is removed from said



reservoir, said observation chamber being connected to said pump chamber so that a lowering of liquid level of said reservoir caused by removal of one drop of fluid from said reservoir causes a drop in pressure in said observation chamber sufficient to cause a formation of a replacement drop of fluid in said port means, said observation chamber having a cross-sectional area of about 0.4 square centimeters and having a length of about 1.6 centimeters, and said pump chamber having a cross-sectional area of about 1.3 square centimeters so that a liquid level change of said reservoir in said pump chamber effected by the replacement drop will cause pressurization of air in said observation chamber sufficient to prevent falling of a subsequent drop of fluid from said port means until the liquid level in the reservoir is again decreased by a further removal of fluid therefrom.

4,173,224

AUTOMATED INTRAVENOUS FLUID REGULATING AND ADMINISTERING APPARATUS

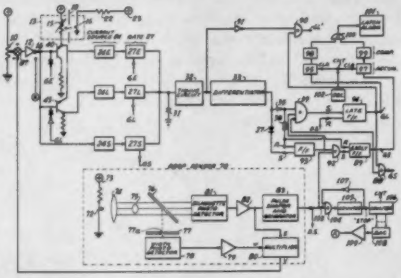
Alvin J. Marx, Rochester, and Abraham Edelman, New York, both of N.Y., assignors to Alvin J. Marx, Rochester, N.Y.

Continuation-in-part of Ser. No. 802,891, Jun. 2, 1977, Pat. No. 4,111,198. This application Jun. 19, 1978, Ser. No. 916,836

Int. Cl.[2] A61M *5/14*

U.S. Cl. 128—214 E **11 Claims**

1. An intravenous fluid regulator apparatus comprising means for establishing a first signal establishing a desired rate of introduction of drops of intravenous fluid to a patient, means for sensing the volume of said drops of fluid and for producing a second signal bearing a relation to the drop volume, and means coupled to said volume sensing means and to said first-



signal establishing means for operatively combining said first and second signals to produce a fluid control signal.

4,173,225

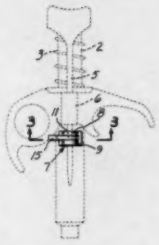
ADJUSTABLE STOP FOR DISPENSING SYRINGE

Howard F. Newman, Los Angeles, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Sep. 27, 1977, Ser. No. 836,995

Int. Cl.[2] A61M *5/00*

U.S. Cl. 128—218 C **6 Claims**



1. A dispensing syringe with a generally cylindrical barrel and having a dose control rod or the like with a longitudinally adjustable stop means connected thereto, wherein the improvement comprises: a pair of members with alignable openings through which the rod extends; a cam surface on one member to engage the other member to misalign the openings causing the members to grippingly engage the rod; and one member is a base with a pair of laterally spaced abutment portions for engaging the syringe barrel to limit rotational movement of the base on the rod during a dose adjustment procedure.

4,173,226

DEVICE FOR ADMINISTERING SOLID DRUG PARTICLES TO AN EYE

John W. Shell, Hillsborough, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 850,275, Nov. 10, 1977, Pat. No. 4,111,544, which is a continuation-in-part of Ser. No. 715,519, Aug. 18, 1976, abandoned, which is a division of Ser. No. 592,555, Jul. 2, 1975, Pat. No. 4,001,388, which is a continuation-in-part of Ser. No. 369,916, Jun. 14, 1973, Pat. No. 3,914,402. This application Jul. 7, 1978, Ser. No. 922,742

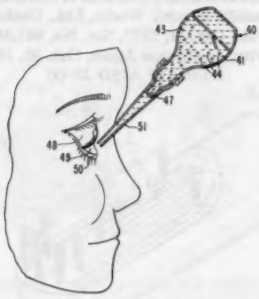
Int. Cl.[2] A61M *1/00*

U.S. Cl. 128—233 **3 Claims**

1. A container made in the shape of a single dosage dropper adapted for administering drug to an eye, said container consisting essentially of;

a wall defining the container, said wall made of a member

selected from the group consisting of a plastic and a glass, and terminated in;
a tip with the wall thereof surrounding and forming a hole;
a cover for the tip;
a space in the container;
a barrier in the space;
a valve carried by the barrier; and



an upper and a lower chamber in the space formed by the barrier, said upper chamber containing solid drug particles administered by the dropper through the hole to the eye, and the lower chamber containing a physiological acceptable carrier for the particles which carrier can move through the valve into the upper chamber and mix with the particles therein.

4,173,227

INJECTING GUN FOR ANIMALS, IN PARTICULAR FOR THE ARTIFICIAL INSEMINATION OF CATTLE

Robert E. J. Cassou, and Bertrand M. E. Cassou, both of Rue Clemenceau, 61300 L'Aigle, France

Filed Jul. 5, 1977, Ser. No. 812,622
Claims priority, application France, Jul. 13, 1976, 7621438; Nov. 3, 1976, 7633107; Jun. 21, 1977, 7718992
Int. Cl.[2] A61M *1/00*
U.S. Cl. 128—235 **27 Claims**

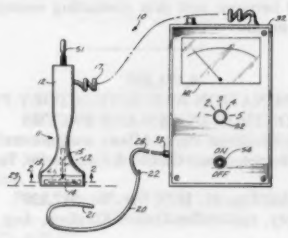
1. An injecting gun for animals, comprising a rigid tubular body defining a throughway axial passage, a holding head defining a bore and provided on the outside of the body adjacent a first end of the body, a flexible sheath surrounding the rigid body, removable means securing a first end portion of the sheath around the holding head of the body, the sheath having a second end portion opposed to said first end portion, which second end portion extends beyond the body and defines an injecting orifice around which orifice there is disposed within the sheath an inner reinforcing end member having a throughway passage, and a push-member slidably mounted in the passage of the body and projecting from the body adjacent the holding head thereof, the rigid body being freely slidably mounted in the holding head and the reinforcing end member being freely slidably mounted in the flexible sheath, the end member and a second end of the body opposed to said first end of the body having such sections that they are capable of bearing axially against each other.

4,173,228

CATHETER LOCATING DEVICE

Donald H. Van Steenwyk, San Marino, and Ira N. Childress, Los Angeles, both of Calif., assignors to Applied Medical Devices, San Marino, Calif.

Filed May 16, 1977, Ser. No. 797,318
Int. Cl.[2] A61M *25/00*
U.S. Cl. 128—653 **15 Claims**



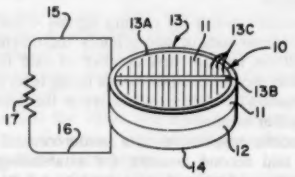
1. A locating system for determining the position of a medical catheter inserted in a body, comprising:
an elongated catheter having a first end adapted for insertion in the body, and a second end which remains external to the body during insertion and use of the catheter;
a receiver coupling means mounted on the catheter adjacent the first end, the receiver coupling means having at least two terminals and being adapted to receive energy radiated from a remote source, and to generate a signal between the terminals which is analogous to the received energy;
connection means connected to the terminals of the receiver coupling means and extending along the catheter toward the second end to terminate outside the body;
generating means external to the body for generating a body-penetrating energy field detectable by the receiver coupling means; and
indicating means connected to the connection means for displaying the extent of coupling between the generating means and receiver coupling means, and thereby indicating the position of the catheter first end within the body.

4,173,229

THERAPEUTIC ADORNMENTS UTILIZING SOLAR CELLS

Leon Halfon, 957 N. Palm Ave., Los Angeles, Calif. 90069

Filed Sep. 15, 1977, Ser. No. 833,503
Int. Cl.[2] A61N *1/18*
U.S. Cl. 128—419 R **12 Claims**



1. A therapeutic adornment in the form of a bracelet, comprising:
solar cell means having an energy absorbing active face surface, a back surface and first and second electrical output terminals, said cell means being operable to convert sunlight and equivalent forms of energy received on its active surface into electrical energy which appears as a voltage across said output terminals;
electrically conductive arm band means for securing said cell means on a person's limb, said arm band means being secured to said cell means to extend rearwardly therefrom

around a person's limb and being electrically connected to said first output terminal; and

electrically conductive skin contacting means secured to said cell means to extend across the back surface thereof so as to contact the skin of a person's limb underlying said cell means back surface, said skin contacting means being electrically connected to said second output terminal whereby electrical energy generated by said cell means causes a beneficial current flow through a person's limb positioned between said skin contacting means and said arm band means.

4,173,230

NOISE ELIMINATION AND REFRACTORY PERIOD CONTROL IN DEMAND PACERS

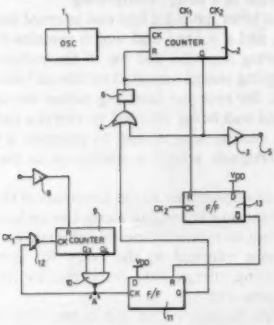
Dennis Digby, Brooklyn Park, Minn., assignor to Biotronik Mess- und Therapiegerate GmbH & Co., Berlin, Fed. Rep. of Germany

Filed Jun. 19, 1978, Ser. No. 917,129

Claims priority, application United Kingdom, Aug. 19, 1977, 34914/77

Int. Cl.[2] **A61N** *1/36*

U.S. Cl. 128—419 PG **3 Claims**



1. Demand cardiac stimulating apparatus comprising:

(a) oscillator means;

(b) first counter means, responsive to said oscillator means, for defining respectively larger predetermined first, second and third count intervals, said first counter being reset upon each achievement of said third count interval, and being resettable independently of said counts at any time completely to reinitiate its full counting sequence;

(c) output amplifier means for generating a stimulating pulse upon each achievement by said first counter of said third count interval;

(d) input amplifier means for sensing signals at the heart;

(e) second counter means, controllably incremented upon each repetition by said first counter of said first count interval, said second counter means being reset to recommence counting by each signal sensed at the heart by said input amplifier means;

(f) gating means, responsive to a predetermined terminal count of said second counter, for establishing a logic control state, said control state inhibiting further incrementing of said second counter until the next subsequent resetting of said second counter by said input amplifier;

(g) first control means, responsive to first achievement by said first counter, after resetting thereof, of said second count interval, said first control means establishing a refractory period for said stimulating apparatus after each resetting of said first counter and otherwise independently of the state of said second counter; and

(h) second control means inhibited by said first control means during said refractory period and thereafter being energized by termination of said logic control state, for resetting said first counter and thereby conditionally extending said refractory period as a function of said terminal count, also providing rejection of demand stimulating response to sensed signals having periodicity of less than said terminal count.

4,173,231

HAIR DRYER ATTACHMENT

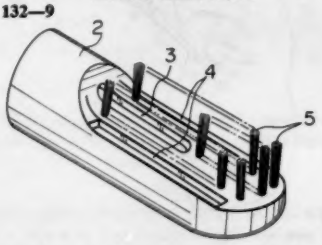
Koichi Isino, and Hisakichi Nose, both of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Oct. 31, 1977, Ser. No. 847,045

Claims priority, application Japan, Oct. 30, 1976, 51-130605

Int. Cl.[2] **A45D** *20/00*

U.S. Cl. 132—9 **2 Claims**



1. A hair dryer attachment comprising an elongate cylindrical body closed at an axial end and opened at the other axial end for mounting the body to an air blow-off port of a hair dryer, said body having a longitudinal axis and comprising a plurality of parallel ribs extending transversely relative to said longitudinal axis, a plurality of longitudinally spaced slots located between said ribs, said transverse ribs extending transversely beyond said slots to form lateral projections, and an elongate bristle fixture comprising a plurality of parallel bristle bases extending transversely relative to said longitudinal axis and interconnected by longitudinal ribs, the quantity and shape of said bases corresponding to that of said transverse ribs in said cylindrical body, and a plurality of rows of bristles extending from respective ones of said bristle bases, said bristle fixture being mounted on said body, with said bristle bases being fitted over said transverse ribs and with both ends of said transverse bristle bases engaging said lateral projections of the body, said slots each having a depth extending in a direction substantially perpendicular to said longitudinal axis for allowing an air stream from the hair dryer to be blown through the slot in a direction perpendicular to said axis, and said slots and rows of bristles lying substantially in directions intersecting said longitudinal axis at right angles to deliver said blown air stream to hair caught between the respective bristle rows.

4,173,232

RESIDUAL COIN DETECTING DEVICE IN COIN PROCESSING MACHINE

Kazuto Asami, and Takashi Okamoto, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan

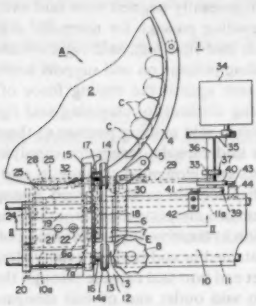
Filed Feb. 28, 1978, Ser. No. 882,038

Int. Cl.[2] **G07D** *3/00*

U.S. Cl. 133—3 R **11 Claims**

1. In a coin processing machine wherein coins to be processed are supplied onto a turntable and thereafter fed in succession through a coin passageway extending from the periphery of the turntable, in which machine the width of the coin passageway is defined by a pair of coin guides which can be adjusted in accordance with the diameter of the coins to be processed by moving at least one of the coin guides which is adjustable, and a control member is provided in engagement with the movable coin guide, the combination therewith of a residual coin detecting device comprising electrical driving means selectively operable for bringing said control member to a predetermined position for moving the adjustable coin guide in response to a signal from a coin denomination setting section

of the machine and a residual coin detecting member movable vertically between the coin guides prior to the movement of said movable coin guide by said electrical driving means



thereby detecting any coin or coins which might be remaining in the coin passageway by the vertical movement of the coin detecting member.

4,173,233

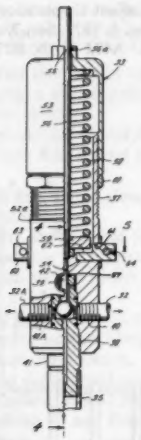
PILOT VALVE

David E. Snyder, Longview, Tex., assignor to U.S. Industries, Inc., New York, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,515

Int. Cl.[2] G05D *7/00*

U.S. Cl. 137—102 **18 Claims**



1. A pilot valve for use in controlling the flow of a control fluid to and from a fluid-operated actuator, comprising a body having a chamber therein, a first port connecting with the chamber to admit control fluid thereto, a first seat about the intersection of the first port with the chamber, a passageway connecting with the chamber, a vent port connecting the passageway with the exterior of the body, a second seat about the connection of the chamber and passageway, a second port for connecting the chamber with the actuator, a ball shiftable in the chamber between a first position seated on the first seat to prevent the admission of control fluid to the chamber while permitting control fluid to exhaust from the chamber out the vent port, and a second position seated on the second seat to prevent the exhaust of control fluid from the chamber out the vent port while admitting control fluid through the first port to the chamber, a spring-pressed stem extending into the chamber to yieldably urge the ball from its second to its first position, whereby said ball is so shifted when the fluid pressure within said chamber drops below a predetermined value, and means for returning the ball to its second position including a part manipulatable from the exterior of the body for moving the stem in a direction away from the second seat to permit the ball to shift from its first to its second position.

4,173,234

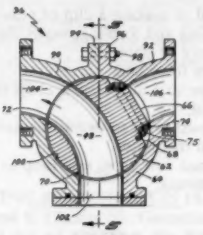
TRANSFER VALVE

David F. Thomas, West St. Paul, and Earl A. Platt, Eden Prairie, both of Minn., assignors to Waterous Company, South St. Paul, Minn.

Filed Nov. 25, 1977, Ser. No. 854,647

Int. Cl.[2] F16K *11/087*

U.S. Cl. 137—625.47 **20 Claims**



1. A fluid transfer valve including:

(a) a valve casing provided with a part-spherical interior sealing surface defining a valve cavity, said casing being provided with at least three valve ports open from outside said casing and through said sealing surface into said cavity;

(b) a valve body provided with a part-spherical outer surface forming part of the outer wall of said valve body and defining a sphere of diameter only slightly less than a sphere defined by the part-spherical interior sealing surface of the valve casing;

(c) said valve body being provided with a valve passage therethrough;

(d) a valve seal structure movable with the valve body and including a portion of said valve body defined by a fluid impervious circular face, an annular valve seal ring in sealing, surrounding relationship to said valve body face, and means to urge said valve seal ring outwardly from said valve body, said valve seal structure being adapted to seal the interior of one of said valve ports from the remainder of the valve cavity and from said passage in the valve body when the valve seal ring is positioned in sealing relation to the casing interior sealing surface in surrounding relation to such port;

(e) means for mounting said valve body in said cavity of said casing in concentric relation to the casing for movement of said valve body between a first position wherein said valve seal ring is in sealing contact with said interior sealing surface of said casing in surrounding relation to a first of said ports and said valve passage is aligned to permit flow between a first combination of two of said ports and a second position wherein said valve seal ring is in clearing relation to said first port and said valve passage is aligned to permit flow between a second combination of two of said ports; and

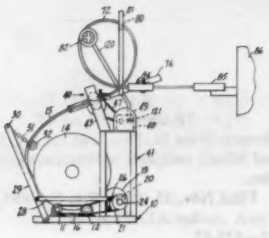
(f) means for moving said valve body between said first and said second positions.

4,173,235

METHOD AND APPARATUS FOR FORMING WIRE TO NONCIRCULAR CROSS SECTIONS

Maynard J. G. Tipper, 25 Melrose Ct., Hillsborough, Calif. 94010

Filed May 19, 1978, Ser. No. 907,738
Int. Cl.[2] B21F *45/22*
U.S. Cl. 140—82 **9 Claims**



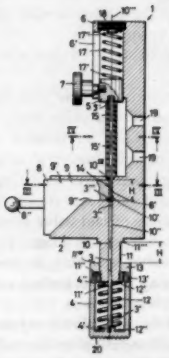
1. In the method of making a clip of noncircular cross section in a wire cutting and forming means the steps of:
providing a source of wire,
feeding said wire from said source,
forming said wire to a noncircular cross section during the feeding thereof,
guiding the formed wire to orient the same in a relatively large loop and thereafter,
feeding the formed wire from said loop to said wire cutting and forming means.

4,173,236

APPARATUS FOR FILLING MAGAZINE OF DENTAL APPLIANCE

Rüdiger Hirdes, Tippelsberger Str. 42, 4630 Bochum, Fed. Rep. of Germany

Continuation of Ser. No. 750,188, Dec. 13, 1976, abandoned.
This application Mar. 2, 1978, Ser. No. 882,565
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1975, 2556574
Int. Cl.[2] B65B *3/12*
U.S. Cl. 141—249 **10 Claims**



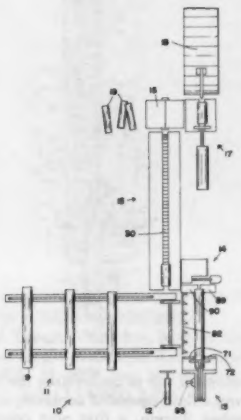
1. An apparatus for charging a moldable plastic dental amalgam mass into the hollow interior of a capsule formed as an elongated magazine tube having a pair of opposite ends and an opening at each end, said hollow interior of said capsule with said openings having a uniform cross-sectional shape, said apparatus comprising a support formed with an elongated passage defining a longitudinal axis and having an outlet end, with a first seat on said outlet end, said seat being snugly fittable with one of the ends of the capsule in a ready position thereof generally aligned with said axis, said support having a guiding passage extending substantially axially of said support in line with said outlet end; holding means including a rigid member in said guiding passage and having a second seat being snugly fittable with the other end of the capsule in a ready position thereof generally aligned with said axis, and resilient means in said guiding passage for normally urging said rigid member towards said first seat, said rigid member being slidable in said guiding passage on said support towards and away from said first seat against the biasing force of said resilient means; a clamping element for clamping said rigid member in a desired position in said guiding passage to thereby provide a rigid holder for said capsule; means for supplying a moldable plastic mass into said elongated passage in said support; and piston means displaceable axially in said passage between a retracted position in a direction away from said first seat and an advanced position to thereby displace a charge of the moldable plastic mass contained in said passage axially along thereof and out of said outlet end into said capsule through the one opening thereof wherein said outlet end of said elongated passage in said support has a cross-sectional shape similar to that of the capsule, said support being provided with a storage chamber adapted to hold the moldable plastic mass and extending transversely from and opening into said elongated passage, and wherein said moldable-plastic-mass supplying means includes a plug snugly fitting in said chamber and displaceable therein transversely of said axis towards and away from said elongated passage for urging a quantity of the moldable plastic mass in said chamber towards and into said elongated passage.

4,173,237

FIREWOOD SYSTEMS

Leo L. Heikkinen, and Charles L. Lundborg, both of Prentice, Wis., assignors to LaFont Corporation, Prentice, Wis.

Filed Aug. 4, 1977, Ser. No. 821,793
Int. Cl.[2] A47J *42/09*; B27L *7/00*
U.S. Cl. 144—3 K **7 Claims**



1. An apparatus for converting a log into firewood comprising:
a log deck for receiving and holding a plurality of logs to be cut into firewood;
means for removing a log from the plurality of logs held on the log deck and delivering the log from said log deck to a log feeder;
said log feeder having means for grasping and securely holding a log delivered from said log deck at one end thereof;
said means for grasping and securely holding a log including a first log support member and a second log support mem-

ber that coact to sandwich a log between said first log support member and said second log support member;

means for cutting the log into fireplace wood when said log is held by said log feeder, means for receiving the log cut into firewood and diverting the cut logs to a splitting mechanism; and

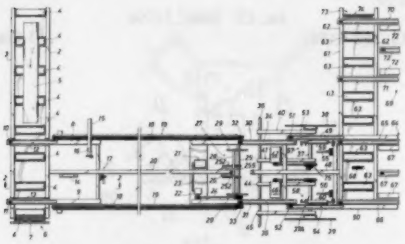
a splitting mechanism for receiving the cut log and for splitting the cut logs.

4,173,238

TRIMMER METHODS AND APPARATUS FOR SAWMILLS

Roy R. Pryor, and Harold A. Pryor, both of P.O. Box 26, Woodville, Tex. 75979

Filed Dec. 6, 1976, Ser. No. 747,436
Int. Cl.[2] B26D *7/06*; B27B *7/00*
U.S. Cl. 144—312 **23 Claims**



1. A method of routing timbers in a sawmill and the like, comprising

conducting a plurality of timbers sequentially and longitudinally along a first path in said sawmill to a first transfer location,

laterally shifting a first one of said timbers from said first transfer location onto a second path extending therefrom to a second transfer location,

laterally shifting a second one of said timbers from said first transfer location onto said second path behind said first timber thereon,

laterally moving said first timber along said second path to said second transfer location,

arcuately and laterally shifting said first timber from said second transfer location to a trimming location while laterally moving said second timber to said second transfer location,

laterally shifting said first timber from said trimming location to a third transfer location along a third path leading to a plurality of receiving location,

arcuately and laterally shifting said second timber from said second transfer location to said trimmer location in response to said shifting of said first timber to said third transfer location, and

shifting said first timber from said third transfer location along said third path to a selected one of said receiving locations.

4,173,239

METHOD OF AND APPARATUS FOR CONTROLLING THE FLOW OF MATERIALS FROM A ROTATING DRUM

Robert F. Reiche, Wheaton, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Jul. 12, 1977, Ser. No. 814,975
Int. Cl.[2] B27L *1/00*
U.S. Cl. 144—311 **24 Claims**

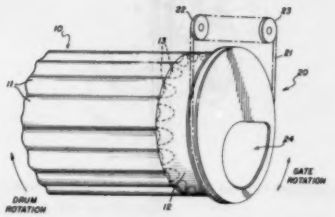
1. Apparatus comprising:

a rotatable material processing cylindrical drum having a substantially horizontal axis and a circular discharge open end,

said drum being supported for rotation by means which contacts the outside of the drum,

a material discharge regulating gate adjoining the discharge end of the drum and separate from the drum,

said gate comprising a vertical circular member having a diameter larger than the discharge end of the rotatable drum,



the circular member having a continuous surface with a material discharge opening therein, and

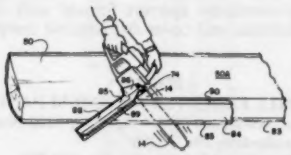
means for rotatably mounting the circular member adjoining the discharge end of the rotatable drum to rotate independent of the drum.

4,173,240

LUMBER CUTTING ATTACHMENTS FOR CHAIN SAWS

Oren D. Boyce, 406 S. Chester St., Gastonia, N.C. 28052

Filed Jul. 12, 1978, Ser. No. 923,774
Int. Cl.[2] B27B *1/00, 17/02*
U.S. Cl. 144—312 **12 Claims**



1. The method of cutting boards of lumber from a log with a portable chain saw having a saw bar and cutting chain, said method comprising the steps of:

(a) providing a visible line on the surface of the log substantially parallel with the longitudinal axis of the log;

(b) cutting a guide channel of a predetermined depth in the log along the visible line;

(c) positioning the saw bar within the guide channel at one end of the log and stabilizing the saw bar within the guide channel while moving the chain saw longitudinally of the log to split the log;

(d) providing a second visible line along one longitudinal edge of the split surface of the log in offset relation to the axis of the log;

(e) defining a second guide channel along said second visible line;

(f) positioning the saw bar in the guide channel at one end of the log and stabilizing the saw bar within the guide channel while drawing the chain saw along the length of the log to simultaneously cut a first slab from the log and define a straight edge on the log;

(g) guiding the chain saw along said straight edge with the saw bar spaced inwardly from said straight edge to cut a board.

4,173,241

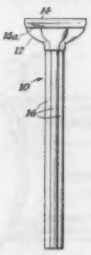
GOLF CLUB WOOD HOLDER

Herman E. Stock, P.O. Box 1718, Pompano Beach, Fla. 33061

Filed Feb. 6, 1978, Ser. No. 875,133

Int. Cl.[2] A63B *65/00*

U.S. Cl. 150—1.5 R **1 Claim**



1. An improved golf club holder and divider for protectively housing golf club woods, comprising:

a resilient pre-molded housing, said housing having an upper open portion and a plurality of integrally formed compartments, each of which is shaped to contour to the upper face of a golf club wood, each compartment having a passage disposed near the base of the compartment, said passages being adjacent each other;

a plurality of tubes, each of which is connected into a different base passage, said tubes being sized slightly longer than the length of the longest golf club shaft of a particular user; and

a resilient cushion, said cushion being disposed in each of said compartments of said housing for engaging the upper surface of the golf club wood

resilient stretchable cover, sized to engage the upper opening of said housing, said cover being diametrically smaller than the diametrical distance across the housing

at least one ventilation aperture formed with said cover installed between said cover and adjacent compartments.

4,173,242

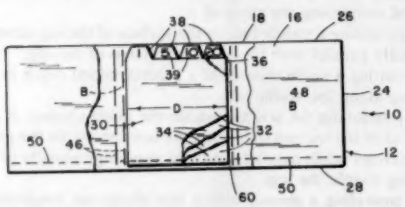
BILLFOLD BILL FILE WITH MINIMUM PANEL AREA

Donald J. Finn, Sea-Ranch-Club - Apt 712, 5100 North Ocean Blvd., Ft. Lauderdale, Fla. 33308

Filed Dec. 15, 1978, Ser. No. 969,719

Int. Cl.[2] A45C *1/06*

U.S. Cl. 150—38 **6 Claims**



1. A billfold file and billfold assembly comprising a billfold said billfold when in one position having forward and rearward outside parallel vertical walls which are each straight, said billfold when in said one position being longer from left to right than from top to bottom, a panel assembly for receiving currency bills, said panel assembly being inside said billfold for quick, easy and accurate storage and removal of bills, said panel assembly comprising: a plurality of vertical panels of flexible material, said panels being disposed in substantial parallelism, each two adjacent ones of said panels having a vertical bill-receiving area therebetween, said bill-receiving areas each being at least at times open at their upper sides, said panels each being of a dimension from left to right which is less than half of the dimension of said billfold from left to right, said panels each being of a dimension from left to right which is less than five inches so as to be substantially less than the length of a common U.S. currency bill, panel attaching means attaching said panels together at only such portions of each of said panels as are disposed exteriorly of said bill-receiving areas, said panels each having currency indicia at their upper portions.

4,173,243

SAFETY TIRE AND WHEEL RIM ASSEMBLY

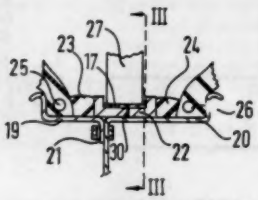
Ralph Wilde, Semele, Near Leamington, and Barrie J. Allbert, Sutton Coldfield, both of England, assignors to Dunlop Limited, Great Britain

Continuation of Ser. No. 728,224, Sep. 30, 1976, abandoned. This application Jun. 6, 1978, Ser. No. 913,090

Claims priority, application United Kingdom, Oct. 17, 1975, 42602/75

Int. Cl.[2] B60C *17/04*

U.S. Cl. 152—158 **5 Claims**



1. A safety tire and wheel rim assembly comprising: a pneumatic tire having a tread, sidewalls and beads, a wheel rim having a pair of bead seats and between the bead seats a substantially uniform diameter, a safety support member to act as a load carrying member in the event of tire deflation, the safety support member comprising a plurality of arcuate segments of rigid material coupled together by means of coupling portions at their ends, a bearing ring of rigid material having a smaller diameter at its mid portion, said mid portion being flat and substantially axially extending with substantially radially extending edges so as to define a channel shape in cross section, providing a bearing in which the support member is rotatably mounted, the bearing ring being divided about a radial plane within the smaller diameter bearing surface of the channel section to facilitate assembly thereof about a support member; locating means contacting both tire beads to locate the bearing ring axially of the assembly and retain the tire beads in position, said locating means comprising a pair of spacer rings of resilient material, one on either side of the bearing ring, said spacer rings frictionally engaging the tire beads and the bearing ring.

4,173,244

ANTI-SKID VEHICLE TIRE CHAINS

Edwin R. Schultz, 2920 Rhett Dr., Xenia, Ohio 45385

Continuation-in-part of Ser. No. 628,742, Nov. 4, 1975, abandoned. This application Jul. 20, 1977, Ser. No. 817,449

Int. Cl.[2] B60C *27/12*

U.S. Cl. 152—218 **1 Claim**

1. A tire chain device comprising

(a) a continuous length of chain made up of a series of permanently connected identical links,

(b) a disconnectable connecting means at each end of the length of chain, each disconnectable connecting means being connectable and disconnectable to any one of the links of the length of chain,

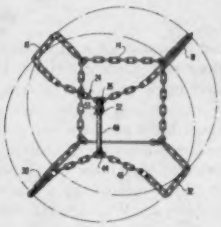
(c) first color identification means associated with one of the two disconnectable connecting means and with a first link of the length of chain to which the one disconnectable

connecting means can be connected so as to form a short loop of the length of chain closed by a short section of the length of chain,

(d) second color identification means associated with the other of the two disconnectable connecting means and with a second link of the length of chain to which the other disconnectable connecting means can be connected so as to form between the first link and the second link a long loop of the length of chain also closed by the short section of the length of chain,

(e) a rigid rod having disconnectable connection means at one end for disconnectable connection to any link of the chain,

(f) means pivotally connecting the other end of the rigid rod to a third link, the third link being located at an intermediate point on one side of the long loop of the length of chain,



(g) third color identification means associated with the disconnectable connection means of the rigid rod and with a fourth link located at an intermediate point on the other side of the long loop of the length of chain to which fourth link the disconnectable connection means of the rigid rod can be disconnectably connected,

(h) a tension member of adjustable length having disconnectable connection means at one end portion,

(i) means for connecting the other end portion of the tension member to a fifth link in the length of chain, the fifth link being located at a midpoint in one of the two loops of chain, and

(j) fourth color identification means associated with a sixth link of the length of chain to which sixth link the other end portion of the tension member of adjustable length can be connected, the sixth link being located at a midpoint in the other of the two loops of chain.

4,173,245

APPARATUS FOR MOUNTING AND DISMOUNTING VEHICLE TIRES

Wilhelm Schäfer, Buchenstrasse 1, D-6349 Herborn-seelbach, Fed. Rep. of Germany

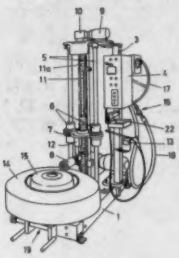
Filed Oct. 19, 1977, Ser. No. 843,674

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1976, 2648897

Int. Cl.[2] **B60C** *25/08*

U.S. Cl. 157—1.24 **8 Claims**

1. Apparatus for the mounting and dismounting of vehicle tires, comprising a machine frame, a horizontal disc carried by said machine frame on which a tire rim can be releasably mounted, means carried by said machine frame for rotating said disc about a vertical axis, a single horizontal roller carried by the machine frame adapted to engage the upper or lower bead of a tire on a tire rim carried by the disc, means carried by the machine frame for moving the roller vertically in either direction to position the roller to act on either the upper or the lower rim of a tire on the disc, and means carried by the machine frame mounting the roller for bodily horizontal movement into and out of positions in which the roller overlies or



underlies a tire on the disc thereby to permit vertical travel of the roller past a tire on the disc.

4,173,246

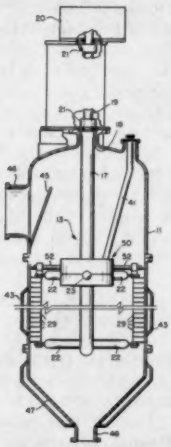
FEED DISTRIBUTOR FOR GLASSED STEEL WIPED FILM EVAPORATOR

Erwin J. Nunlist, Penfield, N.Y., and James Mitchell, Leven, Scotland, assignors to Sybron Corporation, Rochester, N.Y.

Filed Jun. 20, 1977, Ser. No. 808,118

Int. Cl.[2] **B01D** *1/22*

U.S. Cl. 159—6 W **14 Claims**



1. In a glass lined wiped film evaporator having a rotating wiper assembly including a central axial shaft, glass coated steel arms extending outwardly from said axial shaft, and wiper blades supported at the ends of said arms, a corrosion resistant feed distributor comprising:

a one piece annular fluorocarbon distribution chamber surrounding said axial shaft, overlying said cross arms and rotating with said wiper assembly, said chamber being free to expand radially along said arms;

support means mounted at the ends of said glass coated steel arms;

corrosion resistant distributing nozzles extending outwardly from said distribution chamber through said support means and terminating near an interior wall of said evaporator, said nozzles being free to slid in said support means to account for differences in thermal expansion between said nozzles and/or said distribution chamber with respect to said arms; and

means for supplying liquid to be treated in said evaporator to said annular distribution chamber, whereby said liquid

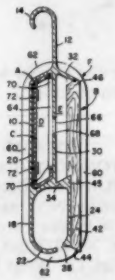
flows from said distribution chamber out through said distributing nozzles and is deposited on the wall of the evaporator as the wiper assembly rotates.

4,173,247

CHAMBERED ELEMENT FOR USE IN FORMING A ROLLER SCREEN

Renato Piana, p.za S. Maria Novella 22, Florence, Italy

Continuation-in-part of Ser. No. 778,228, Mar. 16, 1977. This application Jul. 6, 1978, Ser. No. 922,379
Int. Cl.[2] E06B *3/12*
U.S. Cl. 160—236 **7 Claims**



1. A rod assembly for use in forming a roller screen, said rod assembly comprising a first element having a pair of longitudinally extending, hollow chambers, a common wall separating said chambers, coupling members along the longitudinal edges of the wall means forming one of the hollow chambers, a finish element, said finish element having coupling members formed thereon cooperating with the coupling member along the longitudinal edges of said one of the hollow chambers, said finish element being detachably coupable to said edges of wall means of said one hollow chamber, the effective width of said finish element when coupled to the edges of the said wall means being less than the width of said one hollow chamber such that a pair of side-by-side air spaces are provided in each rod assembly.

4,173,248

MEDIUM DENSITY, HIGH STRENGTH LIGNOCELLULOSE COMPOSITION BOARD INCLUDING EXHAUSTIVELY HYDRATED CELLULOSIC GEL BINDER

James R. Roberts, Palatine, Ill., assignor to Eucatex S.A. Industria e Comercio, Sao Paulo, Brazil

Continuation-in-part of Ser. No. 597,450, Jul. 21, 1975, abandoned. This application Mar. 7, 1978, Ser. No. 884,353
Int. Cl.[2] D21F *11/00*
U.S. Cl. 162—141 **16 Claims**

1. A water laid, pressed and dried medium density lignocellulose composition board having a density of at least 20 pounds per cubic foot and high strength comprising on a dry weight basis:

	% by weight
Lignocellulose fibers	60 to 95
Hydrated cellulosic gel binder	5 to 40

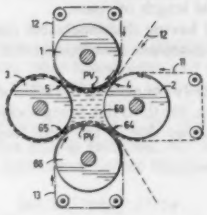
the hydrated cellulosic gel binder being derived from cellulosic chemical pulp and being characterized in its gel condition (1) by a TAPPI drain time of at least 350 seconds and (2) by at least 20% shrinkage, upon being dried to a bone-dry condition, of a TAPPI hand sheet made from the binder.

4,173,249

EXTENDED NIP PRESS FOR A PAPER MACHINE

Seppo Holkko; Jukka Lehtinen, and Pekka Majaniemi, all of Tampere, Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed Jul. 6, 1978, Ser. No. 922,393
Claims priority, application Finland, Jul. 8, 1977, 772143
Int. Cl.[2] D21F *3/04, 3/06*
U.S. Cl. 162—360 R **12 Claims**



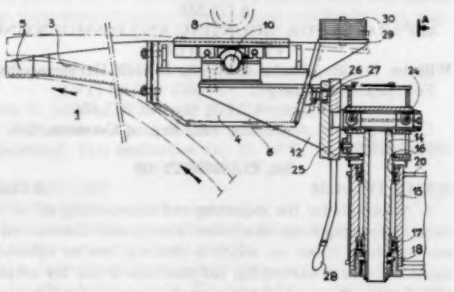
1. An extended nip press for a paper machine for removing liquid from a fiber web passing through the press, the press comprising a first press roll, two second press rolls which engage the first press roll to define two nips, at least one felt which passes through the two nips and is entrained about the periphery of the first roll between the two nips, for conveying the web to be treated through the nips, a pressure-transmitting band which also passes through the nips and is entrained about the periphery of the first roll between the two nips with the felt being disposed between the band and the first roll, and a sealing means arranged between said second rolls for forming a sealed pressure medium chamber which, in use, contains a pressure medium to which the pressure-transmitting band is impermeable and which is limited in the machine direction by the part of the band which is entrained about the periphery of the first roll between the two nips, and also by the second rolls and the sealing means, whereby the web is subjected to the pressure of the pressure medium as it passes between the two nips.

4,173,250

BALANCING AND HOLDING DEVICE FOR A MOLTEN METAL SUPPLY TUNDISH IN A CONTINUOUS CASTING MACHINE

Pierre Houdion, 40 rue Waldeck Rousseau, 77360 Vaires, France

Filed May 4, 1978, Ser. No. 903,031
Claims priority, application France, May 6, 1977, 77 13971
Int. Cl.[2] B22D *11/06, 11/10*
U.S. Cl. 164—434 **3 Claims**



1. A continuous casting machine comprising a vertical wheel rotatable about a horizontal axis and having a peripheral groove partially closed by a strip to form the casting mould, a molten metal tundish having a supply vessel which receives the molten metal and which is borne by two horizontal trunnions

resting on a support allowing the tundish to be pivoted about the axis of the trunnions and about a vertical axis, and a spout which is open at the top, in its casting position is horizontal, forms a continuation of the supply vessel and the end of which remote from the supply vessel has a sealing member and is in contact with the surface of the groove of the casting wheel at the top part thereof, a counterweight being fixed to that region of the supply vessel remote from the region of said vessel connected to the spout, said two regions being situated on either side of the axis of the tundish trunnions, and means being provided for applying an upwardly directed vertical force to the region of the vessel where the counterweight is situated.

4,173,251

MOULD ARRANGEMENT TO BE USED IN A CONTINUOUS CASTING PLANT

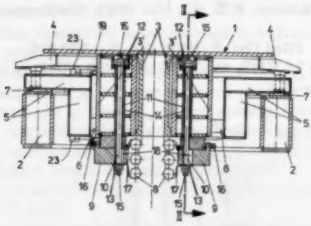
Alois Scheinecker, Linz, Austria, assignor to Vereinigte Österreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Jul. 27, 1977, Ser. No. 819,377

Claims priority, application Austria, Aug. 5, 1976, 5799/76

Int. Cl.[2] B22D *11/04, 11/12*

U.S. Cl. 164—436 **3 Claims**



1. In a mould arrangement to be used in a continuous casting plant, of the type including a mould having inner and outer side walls adjustable together to various strand dimensions, drive means for moving said side walls, strand supporting means arranged below the mould for supporting the strand emerging from the mould, and holding means releasable from above for securing the supporting means to the mould, the improvement which is characterized in that between the inner and outer side walls of the mould there are provided hollow spaces extending to the upper side of the side walls, the holding means being inserted in said hollow spaces so that movement of the mould walls by said drive means provides corresponding movement of the supporting means.

4,173,252

SEAL FOR A ROTARY REGENERATIVE HEAT EXCHANGER

Yoshihiro Sakaki, Yokohama, and Kensuke Eishima, Urawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 413,528, Nov. 7, 1973, abandoned. This application Sep. 21, 1977, Ser. No. 835,300

Claims priority, application Japan, Nov. 20, 1972, 47-132634; Nov. 20, 1972, 47-132635

Int. Cl.[2] F28D *19/00*

U.S. Cl. 165—9 **1 Claim**

1. In a rotary regenerative heat exchanger:

a housing having first, second and third annular grooves formed therein;

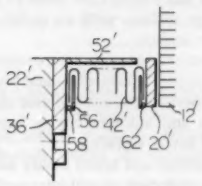
a disc type heat accumulator rotatable within said housing and through which a hot fluid stream flows from a first axial face to a second axial face and cold fluid stream flows from said second axial face to said first axial face, said accumulator being disposed in said housing so that said first and second annular grooves are juxtaposed with said first axial face and said third annular groove juxtaposed with said second axial face;

first, second and third annular sealing shoes, said first and second shoes being disposed in rubbing contact with said first axial face and said third shoe being in rubbing contact with said second axial face, said first, second and third shoes each having an annular groove formed therein;

a first corrugated annular member formed with a plurality of corrugations along the longitudinal length thereof, said first annular member having first and second end portions respectively slidably received in said first annular groove and said annular groove formed in said first shoe in a manner that the thermal expansion of said first annular member can be compensated for and the spaces defined on either side of said end portions in said annular grooves are such that a labyrinth seal effect is produced;

a first annular shield fixedly mounted on said housing at a location juxtaposed with said first annular groove and which extends within said first annular member toward said first axial surface to juxtapose said shoe and define an annular space therebetween so that hot fluid flowing to said first axial face and through said accumulator to said second axial face cannot directly impinge on said first annular member;

a second corrugated annular member formed with a plurality of corrugations along the longitudinal length thereof, said second member having first and second end portions respectively slidably received in said second annular recess and said recess formed in said second shoe so that the thermal expansion of said second annular member can be compensated for and the spaces defined on either side of said end portions in said annular grooves are such that a labyrinth seal effect is produced;



a second annular shield fixedly mounted to said housing at a location juxtaposed with said second annular groove and which extends toward said first axial face to juxtapose said second shoe to define an annular space therebetween so that said cold stream passing from said second axial face through said accumulator to said first axial face and which flows from said first axial face in a heated state having received heat from said accumulator cannot impinge directly on said second annular member; and

a third corrugated annular member formed with a plurality of corrugations along the longitudinal length thereof, said third annular member having first and second end portions respectively slidably received in said third annular groove and said groove formed in said third shoe in a manner such that the thermal expansion of said third annular member can be compensated for and the space defined on either side of said end portions received in said recesses are such that a labyrinth seal effect is produced.

4,173,253

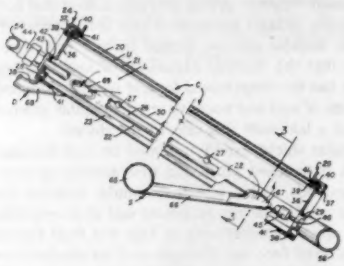
SOLAR RADIATION COLLECTOR AND WATER COOLER

James B. Wiegand, Longmont, Colo., assignor to Solar Energy Research Corp., Longmont, Colo.

Continuation-in-part of Ser. No. 759,762, Jan. 17, 1977, Pat. No. 4,111,187. This application Mar. 20, 1978, Ser. No. 890,640

Int. Cl.[2] **F25B** *29/00*

U.S. Cl. 165—48 S **12 Claims**



1. A solar radiation collector and water cooling unit, comprising:

(a) an upper, outer radiation transmission surface oriented to receive and transmit radient solar rays;

(b) an intermediate radiation absorption surface spaced below said upper surface to receive and absorb said transmitted solar rays and convert the same to heat;

(c) a lower drainage surface, with an outlet, spaced below said intermediate surface;

(d) side and end connection means interconnecting the sides and ends of said upper, intermediate and lower surfaces to define an upper cavity between the said upper and intermediate surfaces and a lower cavity between the said intermediate and lower surfaces;

(e) a spray means within said lower cavity adapted to spray water against the underside of said intermediate surface, to fall to the lower drainage surface and to flow from said outlet; and

(f) an air-flow means having an air duct means to said lower cavity, to selectively pass or prevent a flow of air through the lower cavity, whereby to cool water from the spray means whenever air flows through the lower cavity or permit solar radiation to heat water from the spray means whenever air is prevented from flowing through the lower cavity.

4,173,254

PARTIAL OXIDATION PROCESS

Peter L. Paull, Weston, Conn., and Rodney McGann, Santa Cruz, Calif., assignors to Texaco Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 698,439, Jun. 21, 1976, Pat. No. 4,099,382. This application Nov. 29, 1977, Ser. No. 855,643

Int. Cl.[2] **F28F** *19/00*

U.S. Cl. 165—134 R **12 Claims**

1. A heat exchange apparatus for continuously extracting heat from a hot gas stream by heat exchange with a gaseous coolant comprising: a closed shell; conduit with openings in the walls and positioned within said shell; inlet and outlet means in said shell and in said conduit for passing a portion of said gaseous coolant through said heat exchange apparatus in indirect heat exchange with said hot gas stream; and wherein a portion of said gaseous coolant is continuously bled into said

hot gas stream by way of the openings in said conduit walls to protect the surface of said conduit from said hot gas stream.

4,173,255

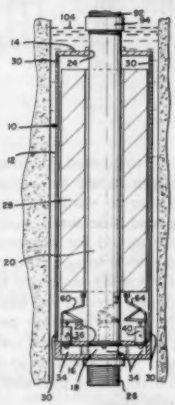
LOW WELL YIELD CONTROL SYSTEM AND METHOD

Richard W. Kramer, R.D. #2, Box 490B, Northumberland, Pa. 17857

Filed Oct. 5, 1978, Ser. No. 948,810

Int. Cl.[2] **E21B** *43/12;* **F01B** *25/00;* **F04B** *49/00*

U.S. Cl. 166—314 **20 Claims**



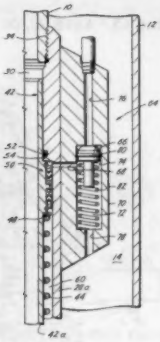
12. A control system for preventing over pumping of liquid from a reservoir including a riser pipe, a plurality of valves having discharge passages communicating the interior of the riser pipe with the exterior of the control system, a float vertically movable in response to change in the level of liquid in the reservoir, and a connection extending from each valve to the float for opening and closing the valve in response to the vertical position of the float, a first connection operable to commence opening a first valve when the float is in a first position and said second connection operable to commence opening a second valve when the float is in a second position located below said first position so that said valves open sequentially upon lowering of the float.

20. The method of pumping liquid from a reservoir and recirculating liquid back to reservoir from the pumped liquid including the steps of smoothly and progressively opening a plurality of valves located in the path of recirculation flow in response to lowering of the liquid level in the reservoir, all of said valves commencing to open one after the other and commencing to open at least one of said valves during opening of another valve.

4,173,256
SUBSURFACE SAFETY VALVE

Marion D. Kilgore, London, England, assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Mar. 9, 1978, Ser. No. 884,766
Int. Cl.[2] E21B 43/12
U.S. Cl. 166—324 16 Claims



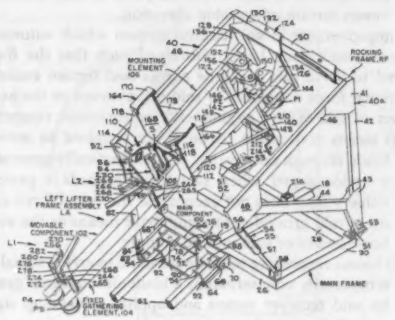
8. A surface controlled subsurface safety valve comprising:
housing means defining a flow path;
closure means for controlling fluid flow through said flow path and movable between a closed position closing said flow path and an opened position opening said flow path;
pressure responsive actuator means for moving said closure means and being normally disposed in a position wherein said closure means is in its closed position;
a source of control fluid for moving said pressure responsive actuator means;
port means between said pressure responsive actuator means and said source of control fluid;
selective controlling means controlling communication between the port means and the source means so that when the pressure of a control fluid is less than a selected value, the selective controlling means is in a first position and communication between said pressure responsive actuator means and the source of control fluid is prevented and communication between said pressure responsive actuator means and a region surrounding said housing means is permitted and when the pressure of control fluid is at least a selected value, the selective controlling means is in a second position and communication between said pressure responsive actuator means and the source of control fluid is permitted and communication between said pressure responsive actuator means and the region surrounding said housing means is prevented; and
said pressure responsive actuator means having a lower chamber which is in pressure communication with the region surrounding said housing means when said selective controlling means is in its first position.

4,173,257
ROOT CROP HARVESTER

Donald G. Mortensen, San Jose, and James T. Browning, Sunnyvale, both of Calif., assigaors to FMC Corporation, San Jose, Calif.

Filed Aug. 11, 1977, Ser. No. 823,781
Int. Cl.[2] A01D 27/00
U.S. Cl. 171—33 11 Claims

1. In a root crop harvester of the type comprising a wheeled chassis having a main frame, a plow on said main frame, a product lifter frame assembly comprising right and left gathering points and lifter belts, topping means comprising cooperating elongate topping units for topping crop received from the lifter belts, each topping unit having a driven end and an idler end, means for driving said lifter belts and the driven end of each topping unit, and means for pivotally mounting said lifter frame assembly on said main frame; the improvement wherein each lifter frame assembly includes a rigid main component that includes a fixed gathering element extending rearwardly from a gathering point and an integral rearward mounting element, a movable gathering component adjustably supported on said main component of the lifter frame assembly, means for

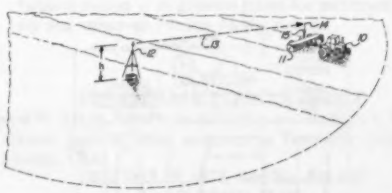


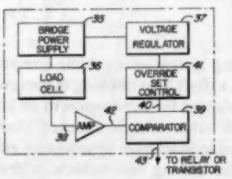
pivotally mounting a rearward portion of said mounting element on said lifter assembly mounting means for accommodating lateral adjustment of said lifter frame assembly, means for rigidly mounting the driven ends of said topping units on a forward portion of said mounting element, and bracket means projecting down from a rearward portion of said mounting element for mounting the idler ends of said topping units.

4,173,258
LASER BEAM LEVEL CONTROL WITH AUTOMATIC OVERRIDE

Marcel J. Boulais, 5346 N. 91st Ave., Tolleson, Ariz. 85353, and Richard A. Boulais, 10314 W. Montecito, Phoenix, Ariz. 85039

Filed Dec. 16, 1977, Ser. No. 861,101
Int. Cl.[2] A01B 63/111, 63/112
U.S. Cl. 172—4.5 1 Claim





1. In a laser beam level control system for an earth-moving machine having a variable height earth-moving blade, ground-contacting drive means and a motive engine, said level control system including

receiver means for sensing a laser beam signal, which signal defines a reference plane, and for generating blade-up and

blade-down command signals in response to the vertical displacement of said receiver means with respect to said reference plane, and

blade operating means responsive to said blade command signals for raising and lowering the earth-moving blade of said machine to maintain the blade at a preselected elevation relative to said reference plane as said machine traverses terrain of variable elevation,

the improvement in said control system which automatically prevents said blade being positioned such that the force required to drive said machine across said terrain exceeds the tractional force capability of said drive means or the available power of said motive engine, said improvement comprising:

(a) means responsive to the force required to move said blade through said terrain, for automatically generating an override signal when said force exceeds a preselected value which does not exceed the tractional force capability of said ground-contacting drive means or the available horsepower of said motive engine;

(b) means responsive to said automatic override signal which temporarily countermands a blade-down signal generated by said receiver means and applies a blade-up signal to said blade operating means; and

(c) means to maintain said override signal as long as said force exceeds said preselected value and to return said blade to control by said laser beam signal as soon as said force no longer exceeds said preselected value.

4,173,259

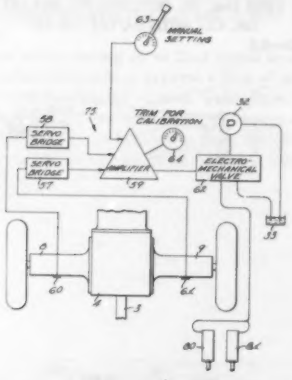
REAR DRIVE ASSEMBLY WITH LOAD SENSING

Edward B. Heckenkamp, Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 29, 1977, Ser. No. 865,675

Int. Cl.[2] A01B *63/112, 63/12*

U.S. Cl. 172—10 **9 Claims**



1. A load sensing system on a vehicle comprising, a vehicle, a vehicle chassis, a draft load hitching means connected to said vehicle chassis adapted for connection to an implement, drive wheel axles with drive wheels attached thereto, said axles rotatably mounted in axle drive housings on either side of said vehicle chassis for driving said vehicle, a draft load sensing means mounted on each of said drive axle housings of said vehicle chassis and spaced from said hitching means, said sensing means directly sensing strain and deformation across a portion of said axle housings of said chassis responsive to the opposing forces of the draft load on said hitching means and the driving force from the drive wheels for operating a draft load control system.

4,173,260

SOIL CULTIVATING IMPLEMENTS

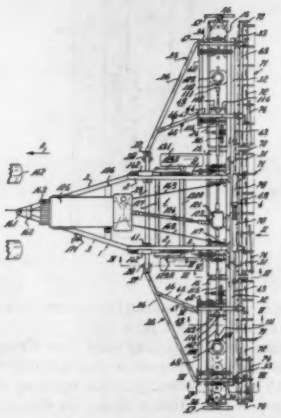
Ary van der Lely, Maasland, and Cornelis J. G. Bom, Rozenburg, both of Netherlands, assignors to Cornelis van der Lely N.V., Maasland, Netherlands

Filed Aug. 18, 1977, Ser. No. 825,583

Claims priority, application Netherlands, Aug. 23, 1976, 7609321

Int. Cl.[2] A01B *33/06*

U.S. Cl. 172—59 **8 Claims**



1. A soil cultivating implement comprising frame means including a main frame and carrier frames pivoted at the lateral sides of the main frame, said main frame and carrier frames each supporting respective groups of soil working members and driving means connected to rotate said members, said groups being positioned adjacent one another side-by-side during operation, means pivoting said carrier frames and respective groups of members to upwardly tilted positions, a central group of working members corresponding to said main frame being interconnected to said carrier frames by connecting means and said central group being raised in horizontal level relative to the main frame by said connecting means when said carrier frames are tilted upwardly, a spring mechanism interconnecting each carrier frame to said main frame, said mechanism and main frame sustaining part of the weight of the carrier frame and the respective group of members during operation, said spring mechanism being connected to said carrier frame and a respective support mounted on said main frame, said support having a latch to retain the carrier frame in its upwardly tilted position, said latch cooperating with a beam of the carrier frame and said latch being automatically engaged upon said beam being tilted upwardly into engagement therewith, said latch having a release mechanism that is operable to disengage from the latch when the tilted carrier frame is lowered into a working position.

4,173,261

AGRICULTURAL FURROWING ASSEMBLY

Willis Wells, Storm Lake, Iowa, assignor to Royal Industries, Inc., a subsidiary of Lear Siegler, Inc., Sac City, Iowa

Filed May 23, 1977, Ser. No. 799,553

Int. Cl.[2] A01B *17/00*

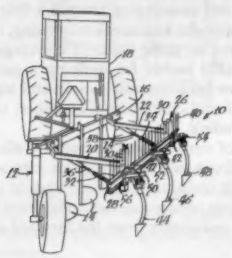
U.S. Cl. 172—136 **7 Claims**

1. In an agricultural furrowing assembly having at least two spaced-apart support arms detachably secured at their forward ends to a beam rigidly attached to a moldboard plow, said plow having a plurality of spaced-apart bottoms thereon and said beam being positioned above the bottoms, an elongated bar assembly pivotably attached to the rear ends of the support arms, the improvement comprising:

a single row of rod-like mulching teeth secured to one side of the elongated bar assembly and extending upwardly therefrom;

a plurality of short tool bars attached to the elongated bar assembly and extending therefrom generally perpindicular to the direction of travel;

a plurality of field cultivators having shanks, the shank of each of said plurality of field cultivators being attached to



one of said short tool bars with the cultivators extending downwardly from the tool bars trailing said plow, said plurality of cultivators being spaced apart from each other by a distance substantially equal to the distance between said spaced-apart bottoms and in alignment with said bottoms to deepen the bottom created furrow, each of said plurality of cultivators having a field-furrowing shank and share for furrowing the ground to increase moisture retention and to minimize wind erosion.

4,173,262

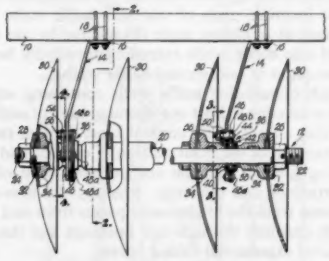
DISC GANG MOUNTING

Raymond A. Adee, Newton, Kans., assignor to Hesston Corporation, Hesston, Kans.

Filed Nov. 25, 1977, Ser. No. 854,887

Int. Cl.[2] A01B *23/00, 71/04*

U.S. Cl. 172—599 **12 Claims**



8. A disc gang mounting comprising:

a support;

an elongated disc gang assembly including a pair of bearings spaced a certain longitudinal distance apart;

a pair of mounting members for the assembly;

means fastening said members to the support,

said fastening means being selectively adjustable to permit adjustment of the position of said members along said support according to said certain distance between said pair of bearings; and

means attaching said assembly to said members for free axial displacement of the assembly relative to said members between a pair of spaced, predetermined limits.

4,173,263

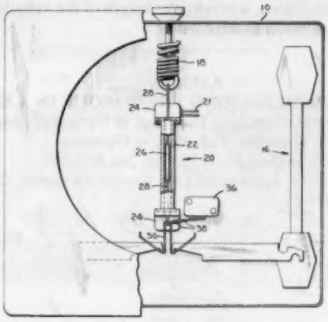
DIGITAL WEIGHING SCALE

Frederick T. Meeks, Asheboro, N.C., assignor to General Electric Company, New York, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,449

Int. Cl.[2] G01G *3/14, 21/08*

U.S. Cl. 177—210 EM **5 Claims**



1. In a digital platform scale having a base and weight supporting cover movable thereon, a lever system in the base converting vertical cover to horizontal lever movement, spring means connecting said base and lever system counterbalancing lever movement, a differential transformer connected to the lever system and to an electrical digital readout to display the weight of an object on the cover, the improvement comprising,

said spring being disposed horizontally in said base and directly and adjustably connected to said horizontal lever system at its point of maximum movement,

said spring connection including a movable differential transformer core as the sole link between the spring and lever and connected to each,

an alignedly fixed winding adjacent said core and connected to activate said readout,

said winding being floatingly fixed to said base,

whereby the core is an integral direct and sole link of the balance system at its greatest travel for maximum sensitivity and minimum friction on the system.

4,173,264

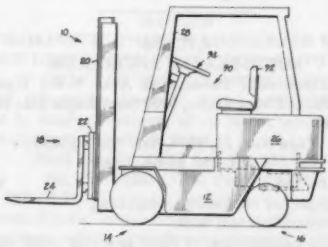
EXPANDABLE VEHICLE FRAME

James W. Erker, Mentor-on-the-Lake, and Richard A. Schwehr, Mentor, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed May 25, 1978, Ser. No. 909,414

Int. Cl.[2] B62D *25/08*

U.S. Cl. 180—68.5 **21 Claims**



1. An adjustable vehicle frame comprising:

a first section;

a channel structure having a channel member secured to the

first section and another channel member removably secured to the first section and in nesting relation with the secured channel member;

a second section;

a portion of the channel structure and a portion of the second section being in lapping relation; and

means for selectively securing together the lapping portions of the channel structure and second section in a variety of relative positions, whereby the length of the vehicle frame may be selectively adjusted.

4,173,265

DEVICE FOR MEASURING THE TORQUE IN A SHAFT

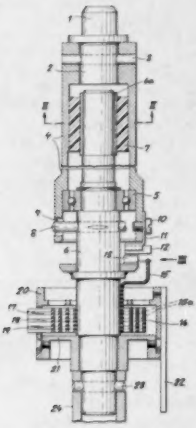
Manfred Kremer, Hamburg, Fed. Rep. of Germany, assignor to Still GmbH, Hamburg, Fed. Rep. of Germany

Filed Dec. 22, 1977, Ser. No. 863,400

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1976, 2658697

Int. Cl.[2] **B62D** *5/04*

U.S. Cl. 180—79.1 **12 Claims**



1. A device for measuring the torque in a shaft, comprising a pair of relatively rotatable shaft parts disposed along a common axis, an elastic body resiliently interconnecting said shaft parts and a signal generator connected to said shaft parts for generating an electric signal representing the torque applied to one of said shaft parts as a function of relative angular displacement of said shaft parts against a restoring force supplied by said body, said signal generator comprising a permanent magnet connected to said one of said shaft parts and a differential field plate sensor mounted on the other of said shaft parts, said magnet being disposed opposite the center of said differential field plate sensor in a no-load condition of said shaft corresponding to a nonstressed condition of said body.

4,173,266

LOUDSPEAKER ENCLOSURE

Robert S. Pizer, 4007 Connecticut Ave., N.W., Washington, D.C. 20008, and Max Tryon, 6008 Namakagan Rd., Bethesda, Md. 20016

Filed Nov. 24, 1978, Ser. No. 963,294

Int. Cl.[2] **H05K** *5/00*

U.S. Cl. 181—156 **6 Claims**

1. A loudspeaker enclosure, comprising

(a) a horizontal bottom wall;

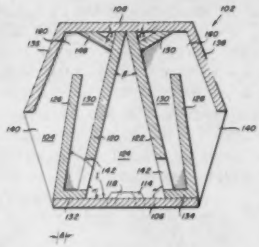
(b) vertical parallel spaced front and rear walls each connected at its lower end with said bottom wall, said front wall containing at least one speaker opening centrally arranged relative to the side edges of said front wall for receiving a loudspeaker;

(c) a horizontal top wall connected with the upper edges of said front and rear walls;

(d) first baffle means defining between said front, rear, bottom and top walls a rearwardly converging compression chamber, said first baffle means including a pair of vertical rearwardly converging first baffle walls, the forward edges of said first baffle walls engaging said front wall at locations equidistant from, and on opposite sides of, said speaker opening, said first baffle walls each being angularly arranged at a first acute angle (α) relative to said front wall and converging toward a first location on said rear wall opposite said speaker opening, thereby to define therebetween an acute angle of convergency (β); and

(e) second baffle means for defining a pair of exponential folded horns between said bottom and top walls on opposite sides of said compression chamber, said second baffle means including

(1) a pair of vertical second baffle walls extending rearwardly from said front wall on opposite sides of said first baffle walls, the forward edges of said second baffle walls being contiguous with the front wall and spaced laterally outwardly from the forward edges of said first



baffle walls, respectively, each of said second baffle walls extending rearwardly at a given angle (γ) from said front wall and terminating in spaced relation from said rear wall, said second baffle walls being arranged at a given acute angle (Δ) relative to said first baffle walls, respectively; and

(2) a pair or vertical forwardly divergent side baffle walls connected at their rear edges with said rear wall at locations on opposite sides of, and equidistant from, said first location, each of said side baffle walls being arranged at an obtuse angle (δ) relative to said rear wall, said side baffle walls extending forwardly beyond the rear edges of said second baffle walls;

(f) each of said first baffle walls containing adjacent its forward edge at least one opening, each of said openings having a trapezoidal vertical cross-section, the vertical dimension of the front portion of each of said openings being greater than the vertical dimension of the rear portion of said openings, whereby the bass-reflux response from the loudspeaker passes from said compression chamber through said openings and through said pair of exponential folded horns.

4,173,267

SPEAKER CABINET

Ikuo Chatani, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 24, 1977, Ser. No. 827,350

Claims priority, application Japan, Sep. 3, 1976, 51-105976

Int. Cl.[2] **A47B** *81/06;* **H05K** *5/00*

U.S. Cl. 181—199 **6 Claims**

1. A speaker cabinet having rear, side, bottom and top walls, a baffle plate having front and back surfaces forming at least a portion of said front wall of said cabinet and formed with at least one speaker opening therein, one or more speakers mounted to said baffle plate on the front surface within said

cabinet and each speaker aligned with an associated one of said speaker openings, a first plurality of generally V-shaped parallel grooves having non-parallel side walls formed in the front surface of said baffle plate, wherein the front side of said baffle

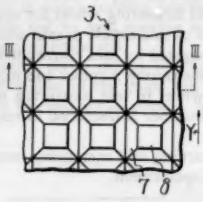


plate is formed with a second plurality of generally V-shaped parallel grooves having non-parallel side walls formed in the front surface of said baffle plate and the orientation of said first and second plurality of parallel grooves being substantially normal to each other.

4,173,268

HOIST MECHANISM

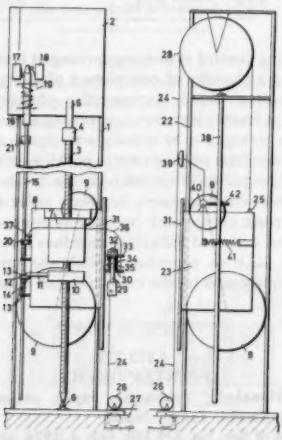
Hans Nussbaum, Korker Strasse 6, 7641 Bodersweier, Fed. Rep. of Germany

Filed Oct. 27, 1977, Ser. No. 846,165

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1976, 2649769; Sep. 23, 1977, 2742961

Int. Cl.[2] B66F 7/00

U.S. Cl. 187—8.49 **11 Claims**



1. In a hoist mechanism having at least two lift columns with a movable lifting slide in each column and drive means for moving one lifting slide up and down the associated lift column, the improvement comprising:

a synchronizing chain connected between said one lifting slide and the other lifting slide in the other lift column for moving such other lifting slide in synchronism with the one lifting slide;

a spring loaded chain support on said one lifting slide, engaging said chain and movable with respect to said one slide on slackening of the chain; and

safety means responsive to such movement of said chain support for stopping said drive means.

4,173,269

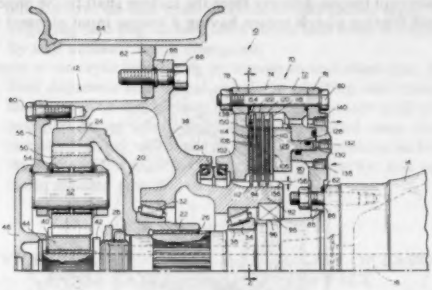
WET BRAKE OR CLUTCH

George A. Craig, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Feb. 23, 1978, Ser. No. 880,689

Int. Cl.[2] F16D 55/36

U.S. Cl. 188—71.5 **15 Claims**



1. In a wet disc brake for an axle outer end assembly of the type having an elongate axle housing; a wheel hub rotatably mounted on said housing by bearing means; means for imparting rotation to said wheel hub at one end of said housing; said disc brake being located near the other end of said housing and having a disc pack located within the brake housing, said disc pack including a plurality of axially movable first discs having projections extending radially outward into axially sliding engagement with retaining means on said brake housing and a plurality of axially movable second discs, intermediate adjacent ones of said first discs, and having projections extending radially inward; said wheel hub including a brake hub portion extending into said brake housing for operatively interconnecting said disc pack with said wheel hub via the axially sliding engagement of said radially inward extending second disc projections with retaining means on said brake hub portion; a generally annular cooling fluid clearance between the outer peripheral surface of said plurality of second discs and said brake housing inner peripheral surface; and means for circulating cooling fluid through said disc pack and said clearance, wherein said improvement comprises a plurality of spaced locating tangs extending radially outward from the peripheral outer surface of said second discs for locating said second discs relative to said brake housing inner peripheral surface so as to permit the removal of said wheel hub, and consequently of said brake hub portion, without causing misalignment between said second disc projections and said retaining means on said brake hub portion to the extent that this misalignment with prohibit subsequent reinstallation of said wheel hub and said annular cooling fluid clearance including a relatively smaller running clearance between said tangs and said brake housing inner peripheral surface.

4,173,270

HYDROKINETIC TORQUE CONVERTER WITH A DIRECT DRIVE LOCK-UP CLUTCH ADAPTED FOR ONE-WAY TORQUE DELIVERY

Howard L. Croswhite; James H. Gregg, both of Livonia, and Angelo L. Guido, Dearborn, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

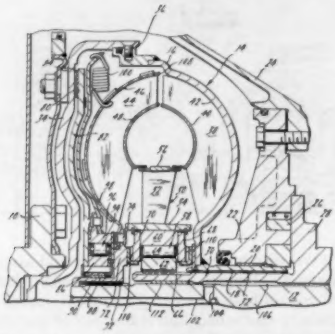
Filed Nov. 14, 1977, Ser. No. 851,005

Int. Cl.[2] F16D 33/00; F16H 47/00

U.S. Cl. 192—3.29 **6 Claims**

1. A hydrokinetic torque transmitting mechanism for use in an automotive vehicle driveline comprising a hydrokinetic torque converter having a bladed impeller and a bladed turbine situated in toroidal fluid flow relationship, said impeller being adapted to be connected to an internal combustion engine, a turbine shaft connected to said turbine and adapted to be connected to the torque input element of multiple ratio gearing, a

selectively engageable friction clutch means for establishing a direct drive connection between said impeller and said turbine shaft, thus establishing a mechanical torque flow path that is in parallel disposition with respect to the hydrokinetic torque flow path through said hydrokinetic mechanism, and a one-way overrunning clutch situated in and forming part of said mechanical torque delivery path for accommodating torque delivery from said impeller to said turbine shaft but adapted to interrupt torque delivery from the turbine shaft to the impeller, said friction clutch means having a torque input element con-



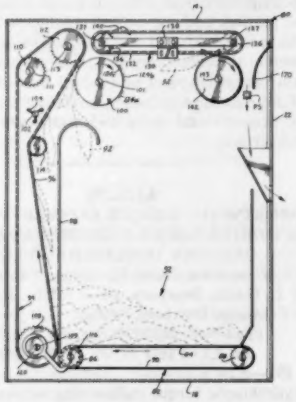
nected continuously to said impeller, said overrunning clutch having a torque input element connected continuously to a torque output element of said friction clutch means, said overrunning clutch having also a torque output element connected to said turbine and an overrunning coupling element between said torque input element and said torque output element of said overrunning clutch adapted to establish a continuous, one-way torque delivery path from said impeller to said turbine upon engagement of said friction clutch means at any turbine speed.

4,173,271

VENDING MACHINE FOR FABRIC-LIKE ARTICLES AND METHOD

Queve E. Copp, 3470 Thornwood Dr., Atlanta, Ga. 30340

Filed Oct. 5, 1977, Ser. No. 839,600
Int. Cl.[2] G07F *7/06*
U.S. Cl. 194—4 C **23 Claims**



1. In a dispensing machine for receiving and examining an article such as a soiled shop towel prior to dispensing a clean one and wherein there is a normally closed cabinet or housing in which there is a place for storage of soiled towels which have been inserted into the machine and a place for storage and dispensing clean towels and wherein there is a slot or opening in the housing through which a clean towel may be positioned on a continuously driven conveyor means having a plurality of spaced positions thereon on which a towel is inserted, there being a measuring wheel continuously contacted by the movement of said article, the improvement comprising:

supporting said measuring wheel for movement in response to the travel of said article as said article such as the shop towel is elongated by said conveyor means,

an elongated measuring member and means connecting said measuring wheel to said measuring member so that said measuring member is displaced in response to the movement,

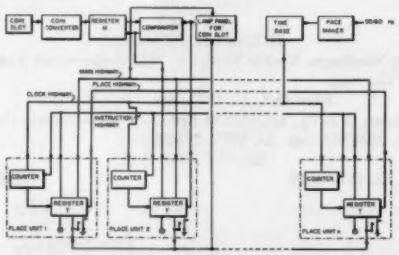
means for returning said measuring member to initial position after displacement.

4,173,272

PARKING CONTROL SYSTEM

Knut A. Von Knorring, Sodertalje, Sweden, assignor to AB Transporteknik, Stockholm, Sweden

Continuation-in-part of Ser. No. 567,130, Apr. 11, 1975. This application Sep. 28, 1977, Ser. No. 837,455
Int. Cl.[2] G07F *15/12*
U.S. Cl. 194—9 T **8 Claims**



1. A parking control system comprising at least one parking meter having a plurality of coin slots; a plurality of indicating members each arranged for one of a plurality of parking spaces, said indicating members comprising a number of visible signal means arranged to be initially activated in dependence of the magnitude of the parking charge paid for each said parking place and arranged to be successively inactivated as the parking period for which payment has been made expires; and a binary electronic control unit operatively connected with said coin slots and with said indicating members for activating and inactivating same in accordance with the prepaid parking charge as represented by the coins inserted in one or more of said coin slots.

4,173,273

PRINTER DEVICE

Takayoshi Hanakata, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 439,150, Feb. 4, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,585
Claims priority, application Japan, Feb. 12, 1973, 48-17159
Int. Cl.[2] B41J *3/20*
U.S. Cl. 400—120 **6 Claims**

1. A printer device comprising:

a printing medium of thermosensitive paper;

a rotatable guide rail disposed in parallel with said printing medium;

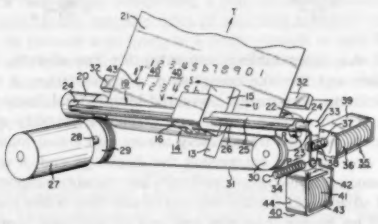
holder means slidably mounted on said guide rail and pivotable in accordance with the pivotal movement of said guide rail;

a thermal head for recording on said printing medium fixed to said holder means;

thermal head moving means for moving said thermal head along said guide rail in one direction and in another direction;

spring means for urging said guide rail tc rotate in a first rotational direction to contact said thermal head with said recording medium with a first pressing force, when said thermal head is in non-recording position and is moved along said guide rail by said moving means in said one direction along said guide rail;

first electromagnetic drive means for further urging, in addition to the urging of the guide rail in the first rotational direction by said spring means, said guide rail to



rotate in said first rotational direction to contact said thermal head with said recording medium with a second pressing force larger than said first pressing force, when said thermal head is in recording position and is stopped on said guide rail; and

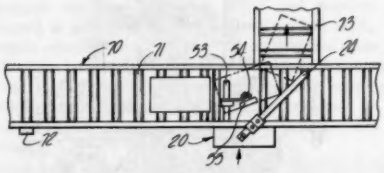
second electromagnetic drive means for urging, against the urging of the guide rail in the first rotational direction by said spring, said guide rail to rotate in a second rotational direction opposite to said first rotational direction to place said thermal head out of contact with said recording medium, when said thermal head is moved, by said moving means, in said other direction opposite to said one direction of the movement thereof.

4,173,274

CONVEYOR LOAD SHUNTING APPARATUS

Edward T. Kantarian, 4325 Arlington Dr., Royal Oak, Mich. 48072, and Donald F. Staub, 814 Fox Run Dr., Bloomfield Hills, Mich. 48013

Filed Mar. 6, 1978, Ser. No. 883,879
Int. Cl.[2] B65G *47/46*
U.S. Cl. 198—367 **5 Claims**



1. Conveyer load shunting apparatus comprising,

a housing mountable on a conveyer,

a main shaft pivotably mounted on said housing,

a radial shunt bar on said main shaft swung by pivotal motion of said main shaft between a neutral position and a shunt position,

a lever on said main shaft,

a peg extending radially from said lever,

an actuator mounted on said housing,

a moving element in said actuator,

a push-pull rod linking said moving element and said lever; when said actuator is energized said moving element retracts moving said main shaft angularly via said push-pull rod and said lever to swing said shunt bar from a neutral position to a shunt position over the conveyer,

a rocker shaft pivotably mounted on said housing having an inner portion within said housing and outer portion for projecting into a conveyer below the load surface of the conveyer,

a radial leg on said outer portion of said rocker shaft equipped with a load engaging wheel, and

a blocker arm on said inner portion of said rocker shaft for engaging said peg on said lever when said lever is swung by said actuator being energized;

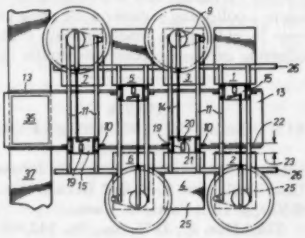
upon a conveyer load being proximate to said shunt bar, the load depresses said wheel angularly pivoting said rocker shaft to swing said blocker arm into engagement with said peg preventing return angular motion of said main shaft thereby holding said shunt bar in shunting position so that the force of the shunting is borne by said blocker arm and taken off said actuator.

4,173,275

DEVICE FOR ASSEMBLING A PLURALITY OF LARGE PANEL LAYERS INTO A PRESS PACK

Heinrich Pfeiffer, Eppingen, and Richard Brüssel, Sulzfeld, both of Fed. Rep. of Germany, assignors to Maschinenfabrik J. Dieffenbacher GmbH & Co., Eppingen, Fed. Rep. of Germany

Filed Feb. 10, 1977, Ser. No. 767,320
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1976, 2605172
Int. Cl.[2] B65G *47/26*
U.S. Cl. 198—421 **12 Claims**



1. A device for collecting large flexible panel layers, including very thin panel layers, from separate layer stacks and for assembling them into press packs, ready for transfer to a panel press, for the production of layered press panels, for example, the device comprising in combination:

a plurality of parallel layer collecting lines arranged side-by-side and uniformly spaced from one another; each layer collecting line having at least one layer stack associated therewith;

a press pack assembly conveyor having an endless conveyor belt running transversely to the layer collecting lines and past all layer stacks at a short distance therefrom; and

means for driving the press pack assembly conveyor in a stepping motion, the distance of each step being equal to the spacing between the layer collecting lines; and wherein

the press pack assembly conveyor defines a press pack collecting station for each layer collecting line;

each layer collecting line includes: a collecting carriage; means for guiding the collecting carriage for shuttle movements between its layer stack and its collecting station on the press pack assembly conveyor; a suction bank on the collecting carriage capable of singulating a panel layer from the layer stack and of transferring it, under the movement of the collecting carriage, to the collecting station; and a horizontal crank drive connected to the collecting carriage for the creation of said shuttle movements;

the crank drives of all layer collecting lines operate in unison;

the suction bank of each carriage is guided for vertical movements in relation to the carriage and each carriage includes means for moving the suction bank vertically;

at least one of the collecting lines has two layer stacks arranged on opposite sides of the press pack assembly conveyor, in alignment with and identically spaced from the collecting station on said conveyor;

the collecting carriage of said line executes shuttle movements for the alternating pickup and collection of panel layers from both of said layer stacks;

the collecting carriage guide means of said line includes overhead guide rails extending across said conveyor;

the crank drive for the collecting carriage of said line has a crank radius for a carriage stroke which is equal to the distance to be travelled by a panel layer between its stack and the collecting station;

said crank drive further includes a mechanism for creating a supplemental stroke of the collecting carriage which is equal to the distance between the point of release of one panel layer on the collecting station and the point of pickup of the next panel layer on the opposite layer stack, said supplemental stroke mechanism being so related to the crank drive that its effect on the movement of the suction bank on the collecting carriage is to longitudinally shift its crank-generated stroke by the supplemental stroke; and

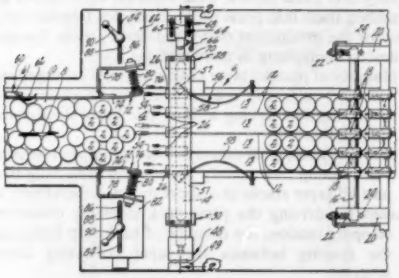
the suction banks on the collecting carriages are arranged to engage the panel layers in the area of the edges which are located nearest to the press pack assembly conveyor, lifting only an edge portion of each panel, as the suction banks move vertically, and transferring each panel from its stack to a collecting station on the press pack assembly conveyor by pulling the panel sideways from its stack, as the collecting carriage executes its shuttle movement.

4,173,276

APPARATUS FOR DETECTING AND CLEARING A JAM OF ARTICLES

John L. Raudat, North Madison; Lloyd D. Johnson, Portland, both of Conn., and Adam Z. Rydell, Decatur, Ga., assignors to Standard-Knapp, Inc., Portland, Conn.

Filed Nov. 17, 1976, Ser. No. 742,968
Int. Cl.[2] B65G *47/26*
U.S. Cl. 198—437 **21 Claims**



1. An apparatus for detecting and clearing a jam of articles at the entrance to an article lane divider, comprising:

(a) a plurality of parallel guides defining lanes for articles;

(b) conveyor means operative to advance articles toward the entrance to said lanes and to move articles in said lanes;

(c) detecting means for detecting a jam of articles at the entrance to said lanes; and

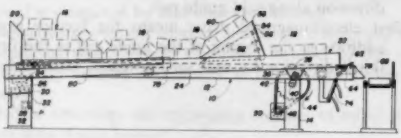
(d) means for moving at least one of said parallel guides transversely to the direction of travel of the articles in response to said detecting means detecting a jam of articles at the entrance to said lanes.

4,173,277

UNSCRAMBLING APPARATUS FOR BAR MATERIAL, INCLUDING LUMBER

Edwin H. Zimmerman, R.D. #1, New Holland, Pa. 17557

Filed Mar. 8, 1978, Ser. No. 884,496
Int. Cl.[2] B65G *47/12*
U.S. Cl. 198—443 **4 Claims**



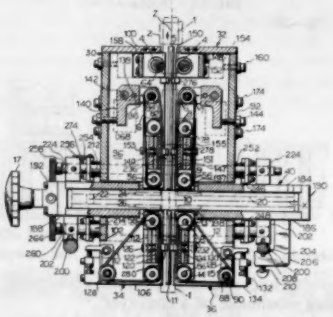
1. An unscrambling apparatus for bar objects, including timber and the like comprising in combination, a stationary base frame comprising elongated longitudinal frame members adapted to receive at one end thereof a plurality of bar-like objects disposed transversely across said frame members and the opposite end comprising the discharge end of said frame, advancing frame means pivotally and slidably supported at one end adjacent said receiving end of said base frame and being at least no higher than said one end of said base frame, power means engaging the opposite end of said advancing frame comprising the discharge end thereof and adapted to successively raise said discharge end of said frame above the level of the discharge end of said stationary base frame and successively lower said discharge end below the level of the discharge end of said base frame while also moving said advancing frame toward the discharge end of said base frame to progressively advance said objects along said base frame toward the discharge end thereof, and means movably supported on said receiving end of said advancing frame means to support said objects and operable to adjustably limit the advancing movement of said objects along said base frame.

4,173,278

TRANSPORT MECHANISM FOR PARTS

Erwin Reitter, Cabot, Ark., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Jan. 26, 1978, Ser. No. 872,498
Int. Cl.[2] B65G *47/31*
U.S. Cl. 198—461 **13 Claims**



7. A transport mechanism for serially feeding discrete parts of a selected cylindrical or prismatic form and selected length, said transport mechanism comprising, in combination:

transport means defining a feed axis and comprising a succession of at least three feed means constructed and arranged to engage the peripheral surfaces of the parts at at least three locations spaced apart along said feed axis at intervals less than the selected length of the parts, and to locate the longitudinal axes of the parts in substantial

coincidence with the feed axis, a work station being defined along said feed axis intermediate a second and third of said feed means;

and drive means connected for actuating said feed means to advance the parts along said feed axis in translatory non-rotating motion through said work station, said drive means being constructed and arranged to drive a second and third of said succession of feed means at equal feed rates to feed the parts uniformly through said work station, and to drive a first in said succession of feed means at a lower rate than said second and third feed means to separate the parts as they pass from said first to said second feed means;

said first feed means comprising a pair of rolls opposed to one another on opposite sides of said feed axis and rotatable on parallel axes lying in a plane normal to said feed axis, said second and third feed means comprising endless belts arranged in pairs having spans extending substantially parallel to said feed axis and opposed to one another an opposite sides thereof.

4,173,279

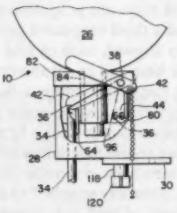
FLUID METERING AND TRANSFER SYSTEM

Robert D. Lichti, Lakewood, and Joseph O. Herrera, Buena Park, both of Calif., and Paul J. Ashley, Boise, Idaho, assignors to Park Mobile, Inc., New York N.Y., by said Joseph O. Herrera and Paul J. Ashley

Filed Oct. 18, 1977, Ser. No. 843,266

Int. Cl.[2] F16N *7/18*

U.S. Cl. 198—500 **16 Claims**



14. A lubrication metering and transfer system for lubricating a conveyor which comprises a drive chain rotatable on a sprocket, a drive shaft for rotating the sprocket, means for rotating said shaft and means for applying lubrication to said drive chain, said system comprising:

a reservoir for containing a lubricant at a predetermined level and located above said lubrication applying means;

a second shaft pivotally mounted;

an elongate member having a distal end portion and mounted at one end thereof to said second shaft, said elongate member having a length such that said distal end portion can be immersed in said lubricant at a first position of said second shaft, said distal end portion retaining a small amount of said lubricant by the adhesion of said lubricant thereto upon pivoting of said shaft from said first position;

a transfer tube spaced from said second shaft a distance approximately equal to the length of said elongate member such that upon pivoting of said shaft to a second position, said distal end portion engages said transfer tube so that the fluid retained on said distal end portion of said elongate member is transferred to said transfer tube which in turn transfers the transferred fluid by gravity flow to said lubrication applying means;

means coupled to the drive shaft for oscillating said second shaft between said first and second positions when said drive shaft is rotating and wherein said elongate member comprises a flexible wire and wherein said wire and said transfer means are spaced apart a distance such that only the distal end of said wire engages said transfer means and such that said wire is flexed upon said engagement so as to permit said removed amount of fluid to be transferred upon said engagement.

4,173,280

APPARATUS FOR DRIVING A MINING MACHINE INTO A DRIVEWAY EXTENDING FROM A MINING ROADWAY

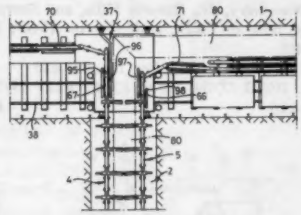
Gordon B. Dawson, Hulland Ward, England, assignor to Atlow Mining Development Consultants Limited, Hulland Ward, England

Filed Oct. 4, 1977, Ser. No. 839,390

Claims priority, application United Kingdom, Jul. 7, 1977, 28522/77

Int. Cl.[2] B65G *15/60*

U.S. Cl. 198—812 **4 Claims**



1. Apparatus for feeding one or more chains of connected push rods into a driveway extending laterally from a mine roadway and comprising a first thrust mechanism for applying force to the push rods in a first direction along the driveway, a second thrust mechanism for applying force to the push rods in a second direction laterally of said first direction along the roadway, means for operating the first thrust mechanism together with the second thrust mechanism, said first thrust mechanism including two drives for applying force along the driveway to two separate chains of push rods, a second thrust mechanism including two further drives each for applying force along the roadway to a respective one of the chains and each operable together with a respective one of the drives of the first thrust mechanism, the drives of the first and second thrust mechanisms each including hydraulic cylinder and releasable couplings for connecting the cylinders to the push rods, and the releasable couplings comprise hydraulically operable latches mounted on the hydraulic cylinders.

4,173,281

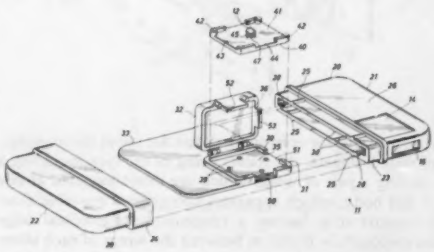
INTRAOCULAR LENS PACKAGING SYSTEM

John H. Trought, Richwood, Tex., assignor to Intermedics Intraocular, Inc., Freeport, Tex.

Filed Jun. 12, 1978, Ser. No. 914,800

Int. Cl.[2] B65D *81/18*; A61F *1/16, 1/18*; B65D *25/54*

U.S. Cl. 206—5.1 **13 Claims**



1. An intraocular lens packaging system, which comprises:

an outer case having a top and a bottom, wherein at least a portion of said top and bottom have optically flat transparent surfaces parallel to and substantially overlying each other;

an inner case sealed within said outer case, said inner case having a top and bottom, wherein at least a portion of said top and bottom have optically flat transparent surfaces parallel to and substantially overlying each other and parallel to and substantially between said optically flat transparent surfaces of said outer case;

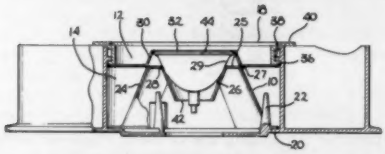
and means for mounting said intraocular lens within said inner case such that said intraocular lens lies in a plane parallel to and substantially between said optically flat transparent surfaces of said inner and outer cases.

4,173,282

SPARE LAMP HOLDER

Benjamin H. Stansbury, Jr., Beverly Hills, and Barry Fluster, Los Angeles, both of Calif., assignors to AVSP, Inc., Los Angeles, Calif.

Filed Sep. 1, 1978, Ser. No. 938,813
Int. Cl.[2] B65D *77/04, 77/26, 85/42;* **F21V** *19/04*
U.S. Cl. 206—216 **10 Claims**



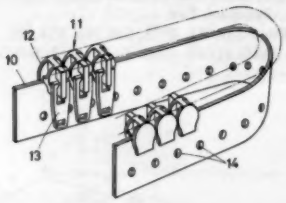
1. In a photographic slide tray for use with an associated slide projector, said tray having a plurality of outwardly extending slide compartments formed about a central cavity, the improvement which comprises a lamp support member disposed in said central cavity, said lamp support member having positioning means for securely holding a spare lamp for said projector.

4,173,283

SUPPORT STRIP FOR READY-FOR USE ARRANGEMENT OF SLIDERS IN THE MANUFACTURE OF SLIDE FASTENERS

Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Chiyoda, Japan

Filed Dec. 16, 1974, Ser. No. 533,243
Claims priority, application Japan, Dec. 24, 1973, 49-1795
Int. Cl.[2] B65D *73/00*
U.S. Cl. 206—338 **6 Claims**



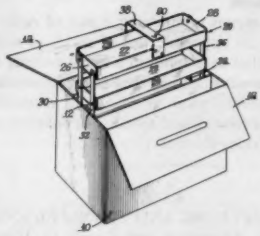
1. An apparatus for conveying sliders for use in the manufacture of slide fasteners, the sliders being of the type including a body having a pair of wings which are interconnected at one end of said body, which apparatus comprises a movable elongated support strip having a continuous longitudinal edge portion disposed for insertion between the wings of each slider body to releaseably support same, in a generally fixed position relative to the support strip and means defining a plurality of apertures spaced apart longitudinally on said support strip and disposed for engagement by a drive means to move said strip and sliders supported thereby.

4,173,284

HINGED TRAY ASSEMBLY

Joseph E. March, Chicago, Ill., assignor to Platt Luggage, Inc., Chicago, Ill.

Filed Mar. 23, 1978, Ser. No. 889,341
Int. Cl.[2] B65D *83/00;* **A47B** *51/00*
U.S. Cl. 206—349 **9 Claims**



1. A carrier comprising a plurality of trays generally identical in shape and dimensions, link means and means pivotally attaching said link means to said trays to permit pivotal relative motion of said trays between a vertically aligned first position in which said trays are vertically aligned, a second supported position in which said trays are progressively offset in a stepwise relationship, and a third supported position in which said trays are horizontally aligned, each of said trays comprising a generally rectangular base and an upstanding flange extending from said base, said flange including a first side wall and a second side wall spaced from and generally parallel to said first side wall, said link means comprising a first pair of link members pivotally attached to the first side wall of each tray and a second pair of link members, generally identical to said first pair of link members, pivotally attached to the second side wall of each tray, each pair of said link members comprising an elongated single first link member of generally constant width and an elongated second single link member of generally constant width, each of said link members being pivotally attached to each of said trays by said pivotal attaching means, the points of pivotal attachment of each link member to each pair of adjacent trays being spaced by a distance greater than the maximum cross-sectional width dimension of each tray, such that all of said link members are generally perpendicular to the planes defined by said bases when said trays are in said first position, such that all of said link members are oblique to the planes defined by said bases when said trays are in said second position, and such that all of said link members are generally parallel to the planes defined by said bases when said trays are in said third position.

4,173,285

DISPENSER FOR BONDED RAZOR BLADE CARTRIDGES

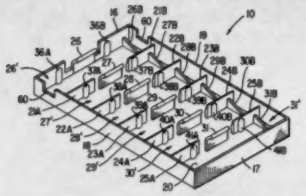
Ernest F. Kiraly, Fairfield, Conn., and Vincent C. Motta, Bronx, N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jul. 31, 1978, Ser. No. 929,484
Int. Cl.[2] B65D *7/00, 57/00, 85/62*
U.S. Cl. 206—356 **11 Claims**

1. A dispenser for a plurality of razor blade cartridges arrayed in a row, said cartridges being normally housed in said dispenser so as to expose means thereon for connecting engagement with a holder for removal from the dispenser, said dispenser comprising:

base means, a peripheral wall upstanding from said base

means, a plurality of spaced partition walls within said peripheral wall and upstanding from said base means, said partition walls being disposed parallel to one another and substantially parallel to portions of said peripheral wall to each define only one respective end of a respective series of generally rectangular open-top compartments disposed in a row, the opposite end of each compartment being



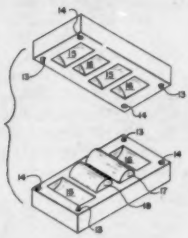
defined by respective substantially free-standing, yieldable retention means upstanding from said base means, and the side walls of said compartments being defined by portions of said peripheral wall, a said cartridge being retained in a respective said open-top compartment by a respective said retention means acting in cooperation with a respective said partition wall in opposed relation therewith.

4,173,286

REUSABLE RESILIENT PACKAGING

John J. Stanko, 327 Coraopolis Rd., Coraopolis, Pa. 15108

Filed Jun. 26, 1978, Ser. No. 919,421
Int. Cl.[2] B65D *85/62, 81/06, 1/36*
U.S. Cl. 206—433 **5 Claims**



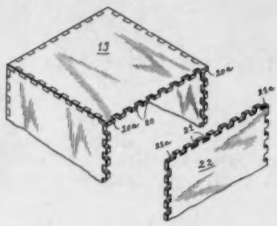
1. A reusable resilient package particularly for the shipment of beverage cans comprising at least first and second half sections, each containing at least one pair of mating recesses, one recess of each pair receiving half of the lengthwise section of a beverage can of one size and the other recess of each pair receiving half of the lengthwise section of a beverage can of different size having a like diameter but a shorter length, cooperating index means on said first and second half sections, said two half sections when superimposed in one position receiving one can of one size and one can of said different size in each pair of mating recesses and in a second position in which one half section is rotated 180° from said first position, receiving two cans of said one different size in each pair of mating recesses, said cans being held against relative movement in said recesses in both positions, fastening means removably connecting said first and second half sections in either said first and second positions and changeable name means on one of said half sections.

4,173,287

METHOD OF MAKING BOARDS AND PACKING CASES MADE THEREFROM

Shozo Kumakawa, 175-1, Nishinonami cho, Hikone City, Shiga Prefecture, Japan

Filed May 25, 1977, Ser. No. 800,223
Claims priority, application Japan, May 25, 1976, 51-60979
Int. Cl.[2] B65D *9/32*
U.S. Cl. 217—65 **4 Claims**



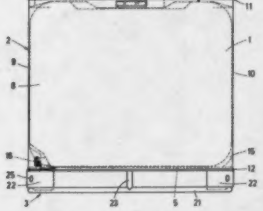
1. A method of making boards (**19**, **22**) for preferably wooden packing cases, comprising the steps of: providing a total odd number of successive connecting elements (**20**, **20***a*, **21**, **21***a*) in the form of tenons (**20**, **20***a*) and mortises (**21**, **21***a*) with a bilateral symmetry along edges of the boards, each tenon and mortise of each edge of each board defining engaging means for mating with a corresponding, equally dimensioned mortise and tenon, respectively, of another equally dimensioned edge of another respective board to form a completed container; selecting an overall length (L) for each edge so that said length can be divided mathematically by a desired basic pitch (W) of the elements, leaving a remainder which is other than zero; providing in each edge a plurality of the elements (**20**, **21**), odd in number, that have said basic pitch, as well as a pair of outermost, additional elements (**20***a*, **21***a*) that have a different pitch (W'); deriving the number of the plurality of elements by dividing said overall edge length by said basic pitch to obtain, with the remainder that is other than zero, the highest possible quotient that is an integral multiple of said basic pitch; however, reducing the result of the division by one when the latter yields an even number and modifying the remainder of said result when an even number is yielded, by adding the basic pitch thereto; and deriving said different pitch by adding a factor (Z) to said basic pitch, which factor corresponds to half said remainder of the division, all numerical values being integers greater than zero.

4,173,288

PALLET CONTAINER

Udo Schutz, Rückersteg 4, D-5418 Selters, Fed. Rep. of Germany

Filed Jun. 14, 1978, Ser. No. 915,501
Int. Cl.[2] B65D *87/00, 7/42*
U.S. Cl. 220—1.5 **7 Claims**



1. Pallet container for the transport of liquids, comprising an

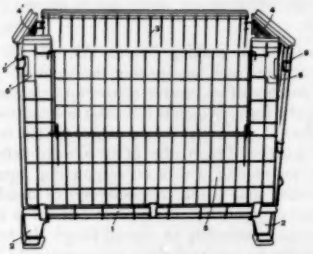
inner container of synthetic resin, an outer shell of sheet metal with a bottom and a lid, said shell having recesses to provide access to filling and outlet openings of said container, a steel tube pallet welded to the underside of the sheet metal shell, said pallet comprising a lower tubular steel frame and an upper tubular steel frame which are welded into a rigid structure at four corners by profiled metal plates, and a profiled ring of foamed plastic material inside said sheet metal shell and supporting the lower corners of said inner container to impart to said inner corners a smoothly rounded configuration.

4,173,289

STEEL WIRE STACKABLE UPSETTABLE-WALL CONTAINER

Gian P. Nesti, Como, Italy, assignor to Campisusa S.P.A., Milan, Italy

Filed Aug. 4, 1978, Ser. No. 931,165
Claims priority, application Italy, Sep. 14, 1977, 22211 B/77
Int. Cl.[2] B65D *7/24, 7/20, 7/00;* **B65J** *1/02*
U.S. Cl. 220—7 **5 Claims**



1. A steel wire stackable upsettable-wall container comprising a base plane and four upsettable reticular structures, made of steel wires which are joint-connected onto the sides of said base plane, one of said reticular structures acting as the rear wall, the opposite reticular structure acting as the front wall and the other two reticular structures acting as the side walls, hook elements located on said side walls, wherein the front wall is laterally provided with two vertically movable plates, said plates being raised and engaging said hook elements when the container is assembled and wherein the edges of the three sides of each plate are bent or folded back and engage the steel wires of the front wall reticular structure.

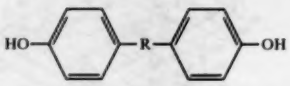
4,173,290

BONDED CAN HAVING HIGH HOT WATER RESISTANCE AND UNDERCOATING COMPOSITION FOR USE IN PRODUCTION THEREOF

Seishichi Kobayashi, Yokohama; Tatsuo Mori, Kawasaki, and Hiroshi Ueno, Yokosuka, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

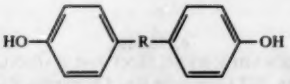
Filed Feb. 7, 1978, Ser. No. 875,889
Int. Cl.[2] B65D *25/14, 25/34;* **B32B** *15/08, 27/38*
U.S. Cl. 220—75 **10 Claims**

1. A bonded can adapted to be subjected to a retort sterilization treatment, which consists of a metal material having both the confronting side edges bonded together by a linear polyamide adhesive through an epoxy-phenolic resin undercoating composition, wherein said epoxy-phenolic resin undercoating composition comprises 50 to 95% by weight of an epoxy resin having a number average molecular weight of 800 to 5500, which is obtained by condensation of an epihalohydrin with bisphenol A, and 5 to 50% by weight of a resol-type phenol-aldehyde resin having a number average molecular weight of 200 to 1000, which is obtained by reacting a mixed phenol comprising 65 to 98% by weight of a dihydric phenol represented by the following general formula:



wherein R stands for a bridging group or is a direct bond, and 2 to 35% by weight of a monohydric phenol with an aldehyde in the presence of a basic catalyst.

10. An undercoating composition for production of bonded cans to be subject to a retort sterlization treatment, which comprises 50 to 95% by weight of an epoxy resin having a number average molecular weight of 800 to 5500, which is obtained by condensation of an epihalohydrin with bisphenol A, and 5 to 50% by weight of a resol-type phenol-aldehyde resin having a number average molecular weight of 200 to 1000, which is obtained by reacting a mixed phenol comprising 65 to 98% by weight of a dihydric phenol represented by the following general formula:



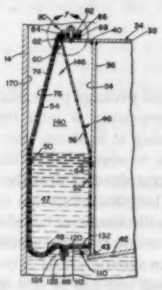
wherein R stands for a bridging group or is a direct bond, and 2 to 35% by weight of a monohydric phenol with an aldehyde in the presence of a basic catalyst.

4,173,291

FLOATING ROOF SEAL

Richard E. Hills, Coraopolis, Pa., assignor to Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.

Filed Jan. 20, 1978, Ser. No. 871,039
Int. Cl.[2] B65D *87/18, 87/20*
U.S. Cl. 220—225 **20 Claims**



1. In a floating roof storage tank, a seal on the floating roof for closing a space defined between the floating roof and a tank wall comprising:

a single thickness, unitary length of pliable material, said length of material having on opposite ends of said length of material end edges, and side edges on opposite sides of

said length of material, and a longitudinal centerline, said length of pliable material being folded back on itself near said longitudinal centerline, said opposite side edges being superposed with each other;

closing means closing said end edges;

first attaching means attaching said superposed pliable material side edges to a storage tank floating roof so that said folded length of material is capable of containing a fluent material therein, said pliable material being attached to a storage tank only by said first attaching means;

a fluent material contained in said folded length of material; and

a scuff band positioned on said seal to be interposed between said pliable material and a storage tank side wall, said scuff band having a pair of opposite side edges and being separate from said length of pliable material and being attached to the floating roof at one side edge thereof by said first attaching means and at the other side edge thereof by a second attaching means, said scuff band supporting said length of pliable material and said fluent material contained therein, said pliable material being continuous and unattached to the floating roof adjacent said second attaching means.

4,173,292

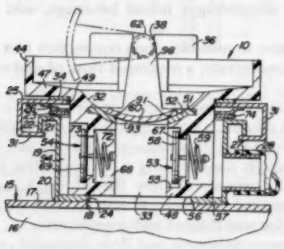
VALVED CLOSURE FOR A PRESSURE VESSEL

Joseph J. Malacheski, and Richard J. Zenda, both of 32 Warner St., both of Plains, Pa. 18705

Continuation-in-part of Ser. No. 901,474, May 1, 1978, Pat. No. 4,147,273. This application Sep. 11, 1978, Ser. No. 941,294

Int. Cl.² B65D *51/16*

U.S. Cl. 220—303 **9 Claims**



1. In a pressure vessel, the combination comprising a vessel top wall, a filling neck upstanding from and opening through said top wall and having a fluid passageway intermediate its vertical extent, a flange on said neck, an annular adaptor for removable engagement over and sealing the upper end of the neck in interfitting relation with the flange, a pair of aligned upwardly opening pedestal bearings upstanding from opposite locations on said adaptor, an annular insert in sealing engagement within said adaptor and entering in spaced relation with said neck into sealing engagement with said top wall, said insert and neck combining to define therebetween a chamber communicating exteriorly through said intermediate passageway, an annular upwardly facing concave seat on said insert, a valve element having a convex exterior sealing region engagable in sealing relation with said seat, a pair of aligned shafts extending from opposite sides of said valve element and journaled in respective bearings to rotatively guide said valve element out of and into said sealing relation with said seat, resilient means yieldably retaining said shafts downwardly in said bearings against internal pressure within said vessel to urge said valve element toward said seat, and a pair of oppositely directed one-way valves in said insert for passing fluid at predetermined pressures in one direction from said vessel through said chamber and intermediate passageway and in the other direction through said intermediate passageway and chamber into said vessel.

4,173,293

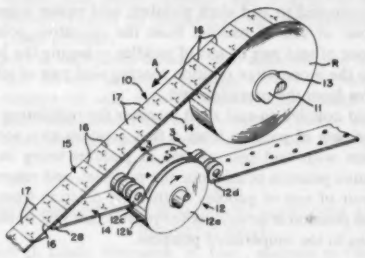
COMPOSITE LABEL WEB AND METHOD OF USING SAME

Paul H. Hamisch, Jr., Franklin, Ohio, and David W. Hubbard, Stamford, Conn., assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation of Ser. No. 629,191, Nov. 5, 1975, abandoned. This application Sep. 9, 1977, Ser. No. 831,833

Int. Cl.² B32B *3/10*; B65H *5/28*

U.S. Cl. 221—1 **3 Claims**



1. In a method of successively dispensing pressure sensitive labels releasably attached to a carrier web of supporting material, the method including the steps of rotatably supporting a supply roll of a composite web of the labels on the carrier web, directing the carrier web about a sharp angle of a delaminator to a rotary feed wheel having peripherally spaced teeth for engaging the carrier web at longitudinally spaced slit means within the carrier web, and pulling the carrier web around the delaminator with the feed wheel to peel the labels successively from the carrier web, the improvement comprising the steps of locating the slit means within the carrier web in longitudinally extending and laterally spaced rows, and staggering the slit means within one row longitudinally relative to the slit means in the other row to provide for passing only one slit means at a time around the delaminator for substantially eliminating tearing of the carrier web at the delaminator.

4,173,294

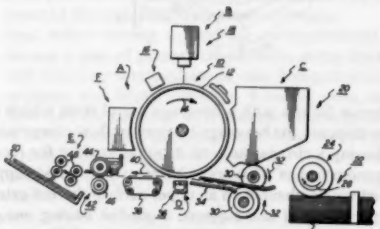
DISPENSER HAVING RECIPROCATING PADDLES FOR DISCHARGING PARTICLES THEREFROM

Robert C. Savage, Macedon, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 23, 1977, Ser. No. 809,346

Int. Cl.² G01F *11/10*

U.S. Cl. 222—1 **6 Claims**



3. A system for developing an electrostatic latent image recorded on a photoconductive member, including:

a housing defining a chamber;

means, disposed in the chamber of said housing, for depositing particles on the latent image;

means for storing a supply of particles therein;

an elongated tubular member having a plurality of spaced

apertures extending in a longitudinal direction therein and having an opening in one end portion thereof coupled to said housing enabling particles to enter said tubular member;

a shaft member mounted translatably and rotatably interiorly of said tubular member;

at least a pair of sets of paddles mounted fixedly on said shaft member with one set of said pair of sets of paddles being angularly and linearly displaced from the other set of said pair of sets of paddles;

a motor coupled to said shaft member, said motor indexing said pair of sets of paddles from the operative position with one of said pair of sets of paddles engaging the particles to the inoperative position spacing said pair of sets of paddles from the particles; and

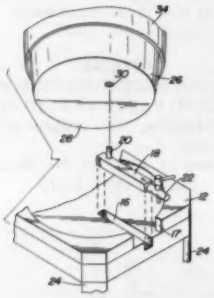
a solenoid coupled to said shaft member for translating said pair of sets of paddles from a first position to a second position with said pair of sets of paddles being in the operative position to advance the particles, and returning said pair of sets of paddles to the first position from the second position after said motor rotates said pair of sets of paddles to the inoperative position.

4,173,295

BARREL DISPENSING SUPPORT

Dieter Steinmann, Glendale, N.Y., assignor to European Design Corporation, Glendale, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,358
Int. Cl.[2] B05D *17/16, 25/36*
U.S. Cl. 222—81 **11 Claims**



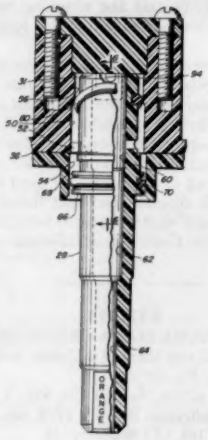
1. A device for use with a beverage barrel from which it is desired to dispense the beverage by gravity flow comprising a support having a circular area on its upper surface for receiving the bottom end of a beverage barrel wherein said support is provided with a channel on an upper surface thereof extending to a periphery of said support, a conduit having one end portion thereof mounted on said support and radially disposed with respect to said circular area, said conduit being located in said channel, an inlet communicating with said one end portion of said conduit and projecting upwardly therefrom, a valved spigot connected to the other end portion of said conduit and being at a location beyond the peripherial portion of said support for dispensing a begerage from a barrel, whereby a beverage barrel may be tapped by placing the barrel on said support and causing said inlet to simultaneous enter through a seal of the bottom wall of the barrel.

4,173,296

APPARATUS FOR MIXING AND DISPENSING A BEVERAGE

William A. Marshall, Elmhurst, Ill., assignor to Alco Foodservice Equipment Company, Miami, Fla.

Filed Oct. 14, 1977, Ser. No. 842,148
Int. Cl.[2] B67D *5/56*
U.S. Cl. 222—129.1 **3 Claims**



1. A device for mixing a concentrated beverage ingredient and a diluent and dispensing a mixed beverage, said device comprising:

(a) means operative to provide, upon connection to a source of beverage concentrate, a measured flow of said concentrate;

(b) means operative to provide, upon connection to a source of pressurized diluent, a controlled flow of said diluent;

(c) means defining a first flow passage receiving said diluent flow therethrough and defining a second flow passage receiving said concentrate flow therethrough, wherein said first and second passages intersect to form a common flow passage for said diluent and concentrate;

(d) dispensing means receiving said flow from said common passage, said dispensing means including:

(i) housing means defining a bore;

(ii) a tubular member movably received in said bore;

(iii) mixing orifice means including first and second orifices communicating with the interior of said tubular member and operative to restrict said flow to an effective flow area substantially less than the flow area of said common passage and to effect mixing of said concentrate and diluent to form a homogeneously mixed beverage, said orifice means including means selectively movable between a first position providing a first effective orifice flow area and a second position providing a second effective orifice flow area greater than said first effective orifice flow area, said selectively movable means including seal means operative to seal between the outer periphery of said tubular member and the inner periphery of said bore in said first position to prevent flow through said second orifice, and operative in said second position to permit flow through said first and second orifices; and,

(iv) diffuser means comprising the interior of said tubular member and receiving all flow of said mixed beverage from said mixing orifice means, said diffuser means being operative to diffuse said flow from said orifice means to substantially atmospheric pressure and to a substantially lower velocity than the velocity through said orifice means, said diffuser means including spout means receiving said diffused flow of mixed beverage,

said spout means being operative to discharge said mixed beverage by gravity flow.

4,173,297

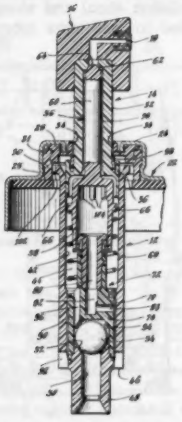
NON-THROTTLING MANUALLY RECIPROCATED PLUNGER PUMP FOR CONSUMER-TYPE LIQUID DISPENSING CONTAINERS

Edward A. Pettersen, Waterbury, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.

Continuation-in-part of Ser. No. 873,358, Jan. 30, 1978, abandoned. This application Mar. 1, 1978, Ser. No. 882,321

Int. Cl.[2] B05L *11/02*

U.S. Cl. 222—321 **10 Claims**



1. In a manually reciprocable pump for dispensing containers;

a housing forming a pump chamber and having provision for fluid intake at one end and discharge at the other, the chamber being open at the discharge end and closed at the intake end;

a fluid inlet formed in the closed end, and an inlet valve seat formed interiorly of said chamber about said inlet;

check valve means coacting with said inlet seat permitting entry of fluid through said inlet into said pump chamber and preventing reverse flow therefrom;

a plunger disposed in said pump chamber for reciprocation therein, said plunger having a skirted hollow head making a sliding piston fit with the wall of the chamber, said plunger including a hollow stem secured to said head and extending axially outwardly of the open end of said chamber to provide a discharge passage therefrom;

a closure member at the open end of said housing, said closure member having a central aperture through which said plunger stem projects axially and which guides said stem during reciprocation, said closure member limiting outward movement of said plunger by abutment of its head against said closure member;

a discharge outlet in said stem passage and a valve seat formed at the upstream side of said discharge outlet;

a differential force actuated control element having a hollow body of lesser diameter than said plunger head and adapted to nest concentrically therewith at its downstream side, said element having a rod secured in it to project axially into said hollow plunger stem in radially spaced relation thereto, said rod having a valve member at its upper end which coacts with the valve seat in said plunger stem to close said discharge outlet;

a compression spring interposed between the closed end of said pump chamber and said control element and biasing its valve member against said plunger valve seat, thereby simultaneously biasing said plunger towards fully extended position in abutment with said housing closure member, said control element moving with said plunger when the plunger stem is manually depressed against said compression spring but capable of independent axial movement relative thereto under influence of pumping pressure in the chamber;

a fitment disposed adjacent said inlet at the closed end of said pump chamber, said fitment and said control element respectively supporting one member of a cylinder/piston combination arranged axially in telescoping relation within said pump chamber and adapted to maintain a piston/cylinder fit throughout full reciprocation of said pump plunger;

a port in said pump housing wall adjacent said fitment and said fitment having a passage which communicates the interior of said cylinder/piston combination with said port, said fitment having a separate passage which communicates said pump chamber with said fluid inlet.

4,173,298

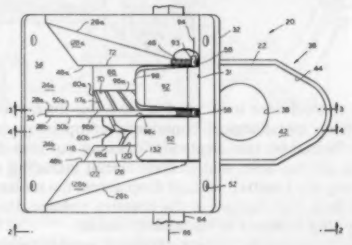
ROTARY FEED CUP HAVING A SPACER AND A PIVOTED SEAL

Robert D. Lease, Bismarck, N. Dak., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Oct. 6, 1977, Ser. No. 839,951

Int. Cl.[2] G01F *11/10, 11/24*

U.S. Cl. 222—368 **5 Claims**



1. A feed cup mechanism which comprises a feed cup having first and second spaced-apart side walls that include respective ones of first and second inner surfaces, having a connecting wall that includes a curvilinear surface, having receiving opening means for receiving material to be fed, having discharge spout means for gravity discharging of material from said feed cup, and having drive shaft apertures that orthogonally and substantially coaxially intercept said side walls;

a drive shaft having an elongated longitudinal axis and being inserted through said drive shaft apertures;

a feed wheel having a metering circumferential surface, having a pair of planar side surfaces, being inserted into said feed cup intermediate of said first and second inner surfaces, and being drivingly mounted onto said drive shaft and cooperating with said curvilinear inner surface to form a metering passage between said metering circumferential surface and said curvilinear inner surface from said receiving opening means to said discharge spout means;

spacer means, having a planar spacing surface, having an outer surface portion that is substantially orthogonal to said planar spacing surface, having a drive shaft opening that orthogonally intercepts said planar spacing surface, and being interposed between one of said inner surfaces of said feed cup and one of said planar side surfaces of said feed wheel with said drive shaft extending through said drive shaft opening, for cooperating with said feed wheel to substantially fill the space between said inner surfaces of said feed cup;

pivoted seal means, being inserted intermediate of said first and second inner surfaces, being pivotally attached to said

feed cup on a pivotal axis that is substantially parallel to said longitudinal axis, and having a swinging end that wings toward and into sealing proximity to both said metering circumferential surface of said feed wheel and said outer surface portion of said spacer means, for preventing said material from passing through said receiving opening means to said discharge spout means except through said metering passage; and

means, comprising said outer surface portion of said spacer means, for preventing said swinging end of said pivoted seal means from contacting said metering circumferential surface of said feed wheel.

4,173,299

ELECTROMAGNETIC VALVE WITH SLAG INDICATOR

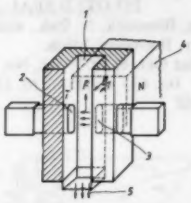
Sten Kollberg, Vasteras, and Lars Tiberg, Fagersta, both of Sweden, assignors to ASEA AB, Vasteras, Sweden

Filed Oct. 25, 1977, Ser. No. 845,366

Claims priority, application Sweden, Oct. 25, 1976, 7611806

Int. Cl.[2] B22D *37/00*

U.S. Cl. 222—594 **2 Claims**



1. A valve device to be used in tap holes for tapping molten metal from metallurgical containers, comprising: an electric circuit formed by two electrodes opening out into the molten metal in the tap hole; said electric circuit including means for measuring the resistive voltage drop across the molten metal in the tap hole, the changes in the resistive voltage drop indicating any slag contents in the molten metal;

a electromagnetic circuit arranged perpendicular to the electric current from the electrodes in the molten metal for generating a magnetic field, thus obtaining a resultant force with or against the molten metal;

means for supplying current to said electromagnetic circuit for generating a DC field;

means for superposing an alternating field on the DC field in the electromagnetic circuit to induce an alternating voltage; and

means for filtering the induced alternating voltage across the metal flow.

4,173,300

HEAT CONDITIONING APPARATUS FOR SHIRT OR BLOUSE-LIKE GARMENT

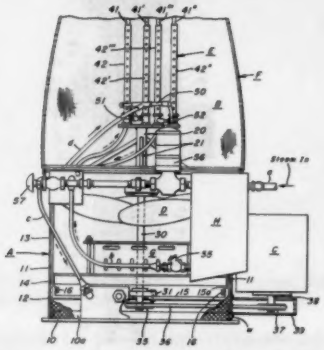
John R. Sanko, Altoona, Pa., assignor to Paris Manufacturing Company, Inc., Brockway, Pa.

Filed Feb. 15, 1978, Ser. No. 877,947

Int. Cl.[2] D06F *73/00*

U.S. Cl. 223—70 **6 Claims**

1. In a high speed improved garment processing apparatus for upright finishing a shirt or blouse-like garment, having a base part and an aligned upper part, wherein the base part has an upwardly extending hollow casing defining an ambient air heating chamber therein, wherein the casing has a lower open wall portion through which ambient air is introduced into the heating chamber, and wherein the upper part has an upwardly extending permeable garment-receiving bag that defines a garment finishing chamber; a heat exchanger mounted in the casing above said open wall portion to extend substantially centrally across the air heating chamber, said heat exchanger defining flow passages for upward movement of and heating of air within the heating chamber, the permeable bag having a lower open end portion and the casing having an upper open end portion adapted to receive and mount the lower open end portion of the bag thereon, a rotating blade assembly operatively positioned within the heating chamber of the casing for drawing-in ambient air through said open wall portion and moving it upwardly through interstices of said heat exchanger into the lower open end portion of the permeable bag, a steam supplying tubular upright assembly securely positioned on and above the casing to extend centrally upwardly along and within the permeable bag, said tubular assembly having a group of transversely spaced-apart longitudinally extending dual-wall tubular element pairs, each said pair having a solid wall inner tube defining a heat transfer passageway therealong, each said pair having a perforated wall outer tube in an outwardly spaced relation about and along said inner tube, a manifold connected to said outer tubes for simultaneously



supplying steam thereto, said inner tubes being series-connected for continuously supplying heat therefrom along the spacing between said inner and outer tubes and along the garment processing chamber during the finishing of a garment, a steam separator, means supplying hot pressurized steam from a source to said separator, means connecting an upper portion of said separator to said manifold for introducing dry steam bursts directly into the garment finishing chamber through the perforated walls of said outer tubes, and means for continuously supplying steam from a lower condensate receiving portion of said separator to and along said series connected inner tubes and from said inner tubes to said heat exchanger for supplying heat within the spacing between said inner and outer tubes to the garment finishing chamber, and to the heat exchanger for continuously heating air moving upwardly therethrough into the garment finishing chamber.

4,173,301

PNEUMATIC BRAKE

Gerhard Turini, Maisach, and Alfred Matthies, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 16, 1977, Ser. No. 851,888

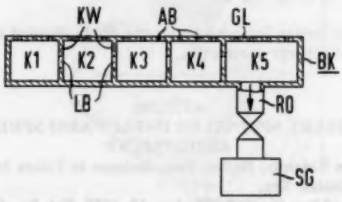
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1977, 2707170

Int. Cl.[2] B65H *23/08*

U.S. Cl. 226—102 **4 Claims**

1. In a pneumatic brake assembly for tensioning a data carrier in an electrostatic printing device where the data carrier passes over a brake surface of the pneumatic brake in contact therewith across substantially the full width of the data carrier, with a suction force being applied at the brake surface to draw the data carrier to the brake surface, the improvement of: the pneumatic brake including an enclosed vacuum chamber having at least one side thereof fromed by the brake surface, a plurality of suction orifices through the brake surface communicating to an interior of the vacuum chamber, the vacuum

chamber being connected to a suction source, suction inhibiting means in the vacuum chamber, the orifices through the brake surface being distributed across the full width of the brake surface, the suction inhibiting means being such that the effective width of the brake element can be adopted to the width of the data carrier passing thereover without adverse reduction of the suction effect through the orifices covered by the data carrier when portions of the brake surface are not covered by the data carrier, the vacuum chamber being subdivided into subchambers by internal partition walls, each of the subchambers open to some of the brake surface orifices, the subchambers being connected to one another through openings in the partition walls between adjacent subchambers, the suction device being connected to a subchamber located at one side end of the vacuum chamber, the side end being adjacent a



transverse edge of the data carrier passing over the pneumatic brake, the openings in the partition walls being of limited cross-section area effective to provide a pressure drop between adjacent chambers when one of the subchambers has a data carrier overlying the portion of the brake surface associated with a first of said adjacent subchambers and another of said adjacent subchambers does not have a data carrier overlying the portion of said brake surface associated with said another of said adjacent subchambers whereby an effective negative pressure is maintained in the first of said subchambers, the partition walls extending along the length of the vacuum chamber in a direction parallel to a path of movement of the data carrier along the brake surface, the vacuum chamber being closed except through the orifices and the connection to the suction device, there being a plurality of partition walls and subchambers transverse the width of the vacuum chamber.

4,173,302

PROCESS AND ALLOY FOR BRAZING ALUMINUM-CONTAINING ARTICLES

Werner Schultze, Bonn, and Heinz Schoer, Alfter, both of Fed. Rep. of Germany, assignors to Vereinigte Aluminium-Werke Aktiengesellschaft, Bonn, Fed. Rep. of Germany

Continuation of Ser. No. 491,072, Jul. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 368,627, Jun. 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 98,173, Dec. 14, 1970, abandoned. This application Sep. 26, 1977, Ser. No. 836,766

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1969, 1962760; Jun. 11, 1970, 2028683; Jul. 14, 1973, 2335940; Mar. 18, 1974, 2412844

The portion of the term of this patent subsequent to May 21, 1991, has been disclaimed.

Int. Cl.[2] **B23K** *1/04, 35/28*

U.S. Cl. 228—219 **10 Claims**

2. In the process of joining aluminum containing articles which comprises heating in contact with said aluminum articles an aluminum silicon filler metal, the improvement which comprises

interposing between said articles an aluminum-silicon base brazing alloy consisting predominantly of aluminum and containing from about 0.0001 to about 1% by weight of a substance selected from the group consisting of sodium, potassium and lithium, from about 0.00001 to about 1.0% by weight of said brazing alloy of berylium, and from about 0.01 to 10% by weight of at least one material selected from the group consisting of bismuth, strontium, barium, and antimony,

maintaining said aluminum articles and said brazing alloy under an inert gas atmosphere or under a vacuum,

brazing said articles with said alloy, and

performing said brazing operation in the absence of a flux.

4,173,303

HYDRAULIC PUSH DRIVE FOR PUSHER CENTRIFUGES

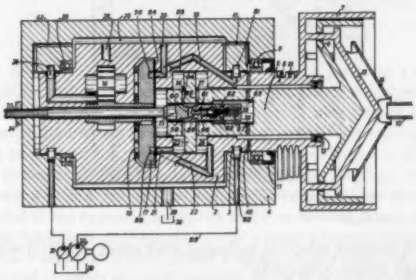
Ivan J. Cyphelly, Neuhaus, Hinteregg, Switzerland (8128)

Filed Jun. 9, 1977, Ser. No. 805,222

Claims priority, application Switzerland, Jun. 15, 1976, 7637/76

Int. Cl.[2] **B04B** *9/06;* **F15B** *21/02*

U.S. Cl. 233—24 **5 Claims**



1. In a hydraulic push drive for a pusher centrifuge having a rotating body with a centrifuge basket attached thereto and a coaxial cylindrical bore therein, a piston disposed in said cylindrical bore defining respective chambers in said cylindrical bore on each side of said piston, said piston being provided with a coaxial piston rod extending beyond said rotating body and having a centrifuge pusher attached thereto, said centrifuge pusher being disposed within said centrifuge basket for simultaneous rotation therewith and a fluid means for supplying a fluid under pressure from a fixed housing to said rotating body, the improvement comprising:

a hydraulic motor, disposed in said rotating body and connected to said fluid means;

a rotary control valve means disposed in said rotating body, for controlling the flow of fluid into and out of said chambers in said cylindrical bore, wherein said hydraulic motor drives said rotary control valve means;

a first fluid control means, disposed outside said rotating body, for controlling the flow of fluid supplied to said hydraulic motor and thereby controlling the stroke frequency of said piston;

a second fluid control means, disposed outside said rotating body, for controlling the flow of fluid supplied to said rotary control valve means and thereby controlling the stroke length of said piston; and

a sensing valve means, disposed in said rotating body, for sensing the pressure applied to said piston and for producing a leakage current flowing from each chamber of said cylindrical bore for controlling the stroke center of said piston, said sensing valve means, said first fluid control means and said second fluid control means controlling, independently, the stroke center, the stroke frequency, and the stroke length of said piston, respectively.

4,173,304

BUILDING STRUCTURE WITH HEAT STORAGE AND RECOVERY

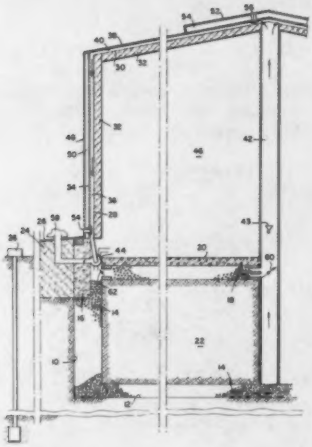
Arthur F. Johnson, 240 Fox Dr., Boulder, Colo. 80303

Continuation-in-part of Ser. No. 742,798, Nov. 18, 1976, Pat. No. 4,054,246, which is a continuation of Ser. No. 551,075, Feb. 20, 1975, abandoned. This application Oct. 14, 1977, Ser. No. 842,320

The portion of the term of this patent subsequent to Oct. 18, 1994, has been disclaimed.

Int. Cl.[2] F24J *3/02*

U.S. Cl. 237—1 A **14 Claims**



7. A building structure including solar energy collection and storage means comprising:

wall and roof elements including solar energy collectors having air passages whereby air may be used as a heat transfer medium;

heat storage means beneath said structure comprising:

peripheral trenches beneath the perimeter of said building filled with gravel, said gravel supporting the building foundations;

a plurality of spaced parallel buried trenches extending between opposed peripheral trenches at the bottom thereof and also filled with gravel;

a layer of gravel underlying the floor of said structure;

all of said gravel being sized to have a minimum diameter of about 1.5 inches; and

means for blowing air through said passages for heat collection, blowing heated or ambient air through said gravel for heat storage or retrieval, and blowing heated air through the interior of said building.

4,173,305

SYSTEM FOR DELIVERING MATERIALS TO DEPOSITION SITE ON OPTICAL WAVEGUIDE BLANK

Michael G. Blankenship, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 10, 1978, Ser. No. 885,215

Int. Cl.[2] B05B *1/24*

U.S. Cl. 239—79 **13 Claims**

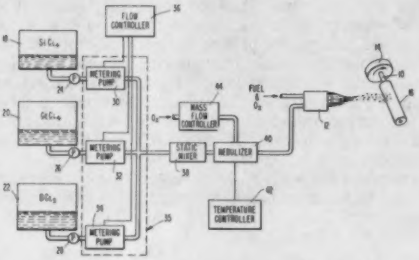
1. In a system including discharge means for depositing a fused siliceous reaction product upon a substrate, the improvement comprising:

first and second reservoirs each for containing a liquid comprising a desired reaction product constituent;

metering pump means coupled to each of said reservoirs for delivering each of the liquids at a controlled flow rate;

mixing means for substantially intermixing liquids received from said metering pump means;

nebulizing means associated with said mixing means for converting the liquids to finely divided form; and



conduit means for conducting the finely divided liquids to the discharge means.

4,173,306

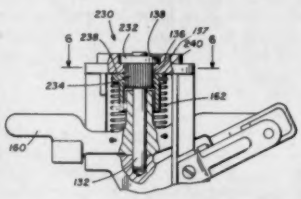
ROTARY SPRINKLER IMPACT ARM SPRING ADJUSTMENT

H. Curtis Ridgway, Dallas, Tex., assignor to Telsco Industries, Inc., Dallas, Tex.

Division of Ser. No. 759,727, Jan. 17, 1977, Pat. No. 4,103,828. This application Mar. 23, 1978, Ser. No. 889,439

Int. Cl.[2] B05B *3/02*

U.S. Cl. 239—230 **2 Claims**



1. Adjustment means for the biased spring on an impact arm of an impact sprinkler having a laterally directed nozzle cooperating with the impact arm which comprises:

a shaft extending above the nozzle on which the impact arm is journaled;

a cage extending above the nozzle within which the arm is mounted and having a top plate with a splined gear extending downwardly therefrom within said cage;

a helical biased spring surrounding said shaft secured at the lower end to the impact arm; and

a ring member surrounding said shaft and comprising an internally splined member for mating with said splined gear and receiving the upper end of said helical spring, whereby adjustment of said spring is by disengaging said internally splined member from said splined gear, turning said internally splined member and reengaging said splined member on said splined gear.

4,173,307

LOAD BEARING VANE STRUCTURE FOR THRUST REVERSAL

Nelson C. Ittner, Blue Jay, Calif., assignor to Harry Feick Co., Inc. and JRS Mfg. Inc., both of Los Angeles, Calif.

Division of Ser. No. 680,173, Apr. 26, 1976, Pat. No. 4,067,094. This application Oct. 28, 1977, Ser. No. 846,548

Int. Cl.[2] B64C *15/04*

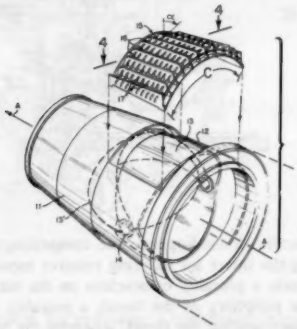
U.S. Cl. 239—265.29 **3 Claims**

1. A load bearing vane structure for reversing the thrust direction of a jet engine wherein pivoted clam shell means are provided to swing from a position covering a side opening in

the engine to a position intercepting the thrust gases normally passing rearwardly of the engine thereby directing the gases laterally out of said side opening, said vane structure comprising:

(a) a plurality of beams extending parallel to each other in side-by-side vertical planes generally in the direction of the thrust axis of said engine when said vane structure is positioned in said side opening; and,

(b) a plurality of vanes in the form of elongated continuous strips extending transversely to the direction of said beams, said beams having closed slots through which said vanes pass to define an egg crate like interlocked grid



structure, said entire vane structure following a convex surface when viewed from above corresponding to the circumferential extent of said side opening so as to fit therein, each of said vanes being tilted in a forward direction so that when said clam shell means intercepts and directs said gases laterally, said vanes guide said gases upwardly and forwardly, the forward component of movement of the gases providing a reverse thrust, the vertical planes within which the beams lie being progressively spaced closer together in a direction starting from the center of said convex surface towards the outer side such that the chord lengths of each vane between successive beams through which it passes are all equal.

4,173,308

SPRINKLERS

Loucas Savvides, 59 Ifigenias St., Acropolis 112 Nicosia, Cyprus

Filed Apr. 24, 1978, Ser. No. 899,188

Int. Cl.² B05B *1/34*

U.S. Cl. 239—383 **8 Claims**

1. A sprinkler head comprising a body defining a generally cylindrical chamber, a liquid inlet to the chamber, and a liquid outlet from the chamber which is located on the central axis of the chamber and in use is located above the inlet, and further comprising a device disposed in the chamber so as to be freely rotatable therein about the central axis thereof, said device comprising a first member having a circular cross-section disposed with the central axis of said circular cross-section substantially parallel to the central axis of the chamber, and a cylindrical member mounted on the top of the first member, so as to be disposed between the first member and said liquid outlet, with its central axis extending substantially perpendicular to the central axis of said circular cross-section, and wherein the liquid inlet is arranged so that liquid entering the chamber by way of said liquid inlet strikes said first member tangentially to rotate it within said chamber.

4,173,309

FLOW CONTROL DEVICES PARTICULARLY USEFUL FOR DRIP IRRIGATION

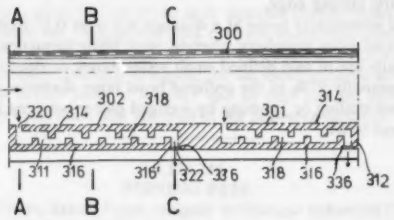
Mordeki Drori, 89 Zahal St., Kiron, Israel

Filed Dec. 9, 1977, Ser. No. 859,100

Claims priority, application Israel, Dec. 10, 1976, 51080

Int. Cl.² B05B *15/02*

U.S. Cl. 239—542 **21 Claims**



1. A fluid flow control device particularly useful as a drip irrigation emitter comprising a first flexible plastic strip bonded on one surface to a second plastic surface along bond lines defining therewith a pressure-dropping passageway having an inlet at one end for receiving pressurized fluid from a conduit and an outlet at the opposite end for outletting the fluid, characterized in that the device includes a further plastic surface bonded to the opposite surface of said first flexible plastic strip along bond lines defining therewith a static pressure chamber in which said first flexible plastic strip serves as a common wall with said chamber and said passageway for at least a pair of the length of said passageway, said static pressure chamber having an inlet at one end for receiving pressurized fluid from the conduit whereby variations in the velocity of the fluid through said passageway causes said common wall to be flexed to vary the cross-sectional area of the passageway and thereby to regulate the fluid flow therethrough.

4,173,310

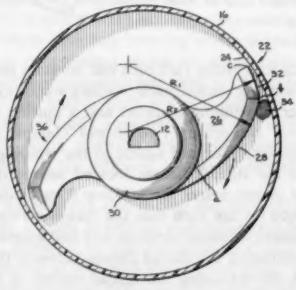
ROTARY CUTTER BLADE

Robert L. Schaeffer, LeRoy, N.Y., assignor to General Electric Company, New York, N.Y.

Filed Apr. 24, 1978, Ser. No. 898,908

Int. Cl.² B02C *18/12*

U.S. Cl. 241—282.1 **4 Claims**



1. A rotary cutter blade for use in an unfluted constant diameter bowl of a defined small series motor driven food

processor with a rotatable hub mounted on a vertically oriented drive shaft, said blade comprising,

a cutting surface formed in two distinct curvatures of substantially equal radii comprising, a radially inner first surface and a radially outer second surface,

said first inner surface including a long circular outwardly convex cutting edge with its center of curvature offset a given amount from the hub axis and terminating inwardly of the bowl inner surface, and

said second outer surface including a short circular outwardly convex cutting edge with its center of curvature offset a lesser amount than said first from the hub axis and extending from tangency with the bowl inner surface to terminate in a substantially pointed intersection with said first cutting edge,

said intersection being at a distance not over 0.2" from the bowl inner periphery whereby such blade formation permits use of said defined small series motor to sweep substantially 97% of the unfluted bowl inner diameter without stalling or jamming by wedged pieces between blade and bowl.

4,173,311

DEVICE FOR CUTTING YARN ON BALL WINDING MACHINES

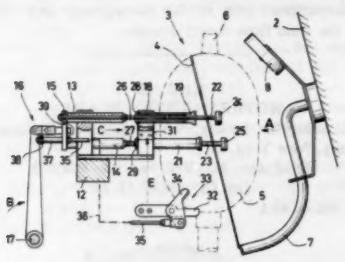
Florian Lucke, Mengen, Fed. Rep. of Germany, assignor to Lucke Apparatebau GmbH, Fed. Rep. of Germany

Filed May 19, 1978, Ser. No. 907,892

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1977, 2724892

Int. Cl.[2] B65H *54/66*; B26D *5/08*

U.S. Cl. 242—2 **6 Claims**



1. A device for cutting yarn on a ball winding machine with at least one winding station, each winding station comprising a winding flyer, a winding mandrel and a cutting device, the cutting device comprising two thread clamps, one of the thread clamps being located nearer to the winding flyer with the other of the thread clamps located nearer the winding mandrel, the clamp nearer the winding flyer having a higher clamping force for the yarn than the thread clamp nearer the winding mandrel; a cutting element; and first means for successively (a) interposing the thread clamps between the flyer and the mandrel, (b) activating the thread clamps to clamp yarn travelling from the flyer to the mandrel, and (c) feeding the yarn clamped between the clamps to the cutting element so that the yarn is severed between the clamps and the cut ends are held in the clamps.

4,173,312

NUMERICALLY CONTROLLED COIL WINDING MACHINE

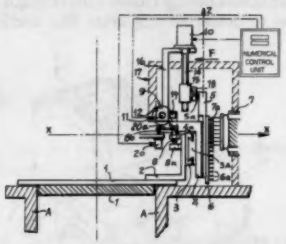
Giuseppe Camardella, Via Miola, 1, 21047 Saronno (Varese), Italy

Filed Nov. 18, 1977, Ser. No. 852,791

Claims priority, application Italy, Nov. 24, 1976, 29698 A/76

Int. Cl.[2] H01F *41/02*

U.S. Cl. 242—7.11 **4 Claims**



1. A turret coil winding machine, comprising a turret, means mounting the turret for indexing rotative movement about a vertical axis, a plurality of brackets on the turret distributed about the periphery of the turret, a plurality of fixed work stations surrounding the turret, whereby the brackets on the turret can be brought sequentially into registry with the work stations by indexing movement of the turret, a plurality of coil supports, means mounting each said coil support for sliding movment on and relative to a said bracket in two orthogonal directions in a vertical plane, and a numerical control unit for controlling a work operation in at least one said work station, said unit having an output comprised by means for moving a said coil support in said at least one work station in said two orthogonal directions, and detachable coupling means for releasably fixing the position of said coil supports relative to said brackets.

4,173,313

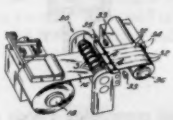
METAL WEB HANDLING METHOD, APPARATUS AND COIL CONSTRUCT

John W. Rogers, c/o 25550 Chagrin Blvd., Cleveland, Ohio 44122

Division of Ser. No. 713,599, Aug. 12, 1976, which is a continuation-in-part of Ser. No. 648,533, Jan. 12, 1976, abandoned, which is a continuation-in-part of Ser. No. 612,275, Sep. 11, 1975, abandoned. This application Jul. 25, 1977, Ser. No. 818,795

Int. Cl.[2] B65H *35/02*

U.S. Cl. 242—56.2 **26 Claims**



1. A method of producing a plurality of strips from an elongated web of sheet metal comprising the steps of:

(a) slitting said web along spaced, parallel parting lines defining sheet metal strips therebetween, said strips at least over a portion of the length of said parting lines being frangibly interconnected,

(b) winding said interconnected strips into a coiled construct, and

(c) completing severence of said web into separate strips after winding of said construct has commenced.

4,173,314

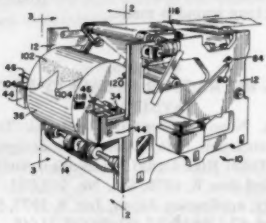
CONTINUOUS WEB SUPPLY APPARATUS

Thomas F. Curran, Wauconda; Leonard I. Tafel, Palatine; Caspar F. Engert, Northlake, and Robert E. LaBarre, Hanover Park, all of Ill., assignors to Cary Metal Products, Inc., Barrington, Ill.

Filed Apr. 17, 1978, Ser. No. 896,697

Int. Cl.[2] B65H *19/16*

U.S. Cl. 242—58.4 **23 Claims**



1. In an apparatus for providing a continuous supply of a web wherein the web is fed from a roll supported in a forward position on a roll stand, another roll of web material supported in a rearward position on the roll stand, and means actuatable in response to near depletion of the forward roll for adhesively connecting a leading end portion of the web of the rearward roll with the web of the forward roll and for thereafter severing the engaged portion of the forward roll from the remainder of the forward roll, the improvement comprising one belt means for drivingly engaging both the forward and rearward rolls prior to connecting of the webs of the respective rolls whereby the rolls are driven at substantially the same speed when the connection is made, tension control means for maintaining a predetermined tension in the web, said control means including means for changing the speed of said belt means in response to the detection of variations from said predetermined tension, the change in speed restoring said predetermined tension in said web.

4,173,315

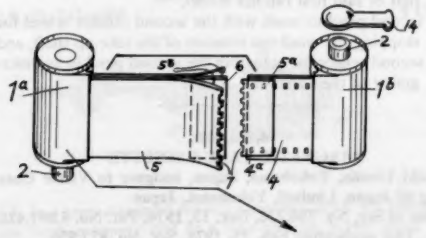
UNIVERSAL 35MM FILM CARTRIDGE FOR REWIND AND NO-REWIND OPERATION

Karl C. Clausser, 695 La Cadena Dr., Riverside, Calif. 92501

Filed May 25, 1978, Ser. No. 909,515

Int. Cl.[2] B65M *75/28*

U.S. Cl. 242—74 **2 Claims**



1. A universal 35 mm film cartridge for rewind or no-rewind operation, comprising:

a hollow cylindrical cartridge having a rotatable core at the center thereof;

an elongated trailer of one-sided adhesive tape wrapped at its midpoint around said core with the adhesive side facing toward and adhered to the core, the two ends of said tape having their adhesive sides face-to-face and adhered together for a substantial portion of their length, and extending from said core in a generally radial or tangential direction;

unexposed film having a specified length of its end sandwiched between the extremities of said adhesive tape ends and firmly adhered thereto;

an insert of non-stick sheet material disposed between said tapes and extending from the tip end of said film toward said core for a distance substantially equal to said specified length;

said tape ends having a line of cross-perforations at the juncture between said film end and said non-stick material, whereby the film end and attached portions of adhesive tape can be broken off so as to separate the film from said trailer, the edge of non-stick material being then exposed, whereby the two tape ends can be pulled apart from the non-stick material to expose the adhesive surfaces so that the leader strip of another roll of film can be inserted between them and adhered to the adhesive surfaces.

4,173,316

FISHING REEL

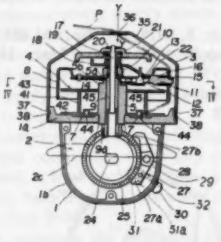
Hideo Noda, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Jul. 25, 1977, Ser. No. 818,659

Claims priority, application Japan, Aug. 7, 1976, 51/105573[U]; Aug. 12, 1976, 51/109208[U]

Int. Cl.[2] A01K *89/01*

U.S. Cl. 242—84.2 R **1 Claim**



1. A fishing reel mountable to a fishing rod for winding a fishing line on a spool by operating a handle bar, said fishing reel comprising:

(a) a reel body, said reel body having a handle shaft, a rotatable shaft, a transmission and an anti-reverse-rotation mechanism, said handle shaft being provided with said handle bar fixed thereto, said rotatable shaft having an axis directed to intersect with an axis of said handle shaft and being rotatable by said handle shaft to said rotatable shaft, said anti-reverse-rotation mechanism preventing said handle shaft from reversely rotating and comprising a gear and a pair of retaining pawls on a pivotally mounted carrier and meshable with said gear, said gear being fixed to one of said handle shaft and said rotatable shaft, said pawls being pivotally mounted to said reel body, each of said pawls being meshable with said gear individually with respect to the different rotational direction of said handle shaft,

(b) a spool for winding said fishing line thereon said spool comprising a drum having an inner diameter larger than the outer diameter of said rotatable shaft and a pair of flanges formed at the axial ends of said drum, said spool being mounted around said rotatable shaft at the reel body in the relation of being capable of being turned over and of being non-rotatable with respect to said reel body,

(c) a rotatable frame fixed to said rotatable shaft to be rotat-

able in cooperation therewith, said rotatable frame having a guide lever for guiding said fishing line onto said spool,

(d) a cover for said spool and rotatable frame, said cover being detachably mounted to said reel body and having at the center portion a through hole through which said fishing lines passes,

(e) a mounting leg for mounting said reel body to said fishing rod, said mounting leg extending parallel to the axis of said rotatable shaft and having at the end of the extension a mounting seat face extending lengthwise to be substantially at the right angle with respect to the axis of said rotatable shaft, so that said reel body is mounted to said fishing rod through said mounting leg in such a manner that the center line of said through hole is directed substantially at a right angle to the longitudinal direction of said fishing rod, whereby said fishing line is drawn out through said through hole toward the tip of said rod so as to be bent substantially at a right angle with respect to the center line of said through hole, and

(f) a control including a control lever for controlling one of said two retaining pawls of the anti-reverse-rotation mechanism, said control being mounted to said reel body by a pivot spaced from the pivot point of said pawl carrier, said control lever being mounted on an eccentric pivot on said reel body and having pin means protruding therefrom at a position outside the axis of the pivot of the carrier so as to contact the carrier to control the meshing of the pawls with the anti-reverse gear.

4,173,317

SOUND GENERATING MECHANISM FOR A SPINNING REEL

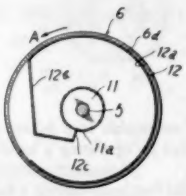
Norio Hamayasu, Sakai, and Kiyohide Kamikawa, Osaka, both of Japan, assignors to Shimano Industrial Company, Limited, Osaka, Japan

Filed Mar. 8, 1978, Ser. No. 884,425

Claims priority, application Japan, Mar. 18, 1977, 52-33772[U]; Mar. 18, 1977, 52-33773[U]

Int. Cl.[2] A01K *89/01*

U.S. Cl. 242—84.21 R **8 Claims**



1. A sound generating mechanism provided at a spinning fishing reel, the latter comprising a reel body with a crank handle; a rotor supported to said reel body and rotatable by operating said crank handle; a spool spindle supported to said reel body in relation of being non-rotatable but axially movable only; a spool supported rotatably to said spool spindle and comprising a trunk onto the outer periphery of which is wound a fishing line, a front and a rear wall provided at both axial ends of said trunk, and a cylindrical wall extending axially rearward of said rear wall from the outer periphery thereof; and a drag mechanism applying resistance against rotation of the spool; said sound generating mechanism comprising,

sounding teeth mounted to be stationary with respect to said spool spindle, and

a sound generating element in mesh with said teeth for making successive clicking sounds, said sound generating element comprising a long strip of elastic material having a support portion bent in a circular arc and in engagement with an inner periphery portion of said spool, an extension portion extending radially inwardly of said support portion from the tip thereof, and a sound generating portion provided at said tip of the extension portion, said sound generating element being attached to said inner periphery portion in relation of having said sound generating portion positioned ahead of said support portion in the direction of spool rotation when a line is drawn out therefrom, so that when said spool rotates in the direction of drawing out the line said support portion diametrically expands to lock against the inner periphery portion of said spool to thereby cause said sound generating portion to move relative to said teeth and make a clicking sound and, when said spool rotates in the direction of winding up the line, said support portion diametrically contracts so that said support portion slips relative to said spool and said sound generating portion does not move relative to said teeth so that no clicking sound is made.

4,173,318

WEBBING RETRACTOR IN SAFETY SEATBELT SYSTEM

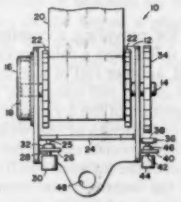
Keiichi Tamura, Nagoya; Masahiro Iwatsuki, Toyoake, and Muneharu Matsunami, Seto, all of Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Jun. 6, 1978, Ser. No. 913,021

Claims priority, application Japan, Jun. 8, 1977, 52/74364[U]

Int. Cl.[2] A62B *35/02;* **B65H** *75/48*

U.S. Cl. 242—107.4 A **4 Claims**



1. A webbing retractor in a safety seatbelt system, wherein the webbing is wound up on a take-up shaft through a biasing force, said retractor comprising:

a first sensor for sensing the vibrations of the vehicle;

a locking device actuated by said sensor to prevent the biasing force of the take-up shaft from being applied to the webbing, said locking device comprising a first ratchet wheel solidly secured to the take-up shaft and a first pawl actuated by said first sensor to mesh with said first ratchet wheel to thereby prevent wind-up rotations of the first ratchet wheel and the take-up shaft; and

a means for preventing an unwinding rotation of said take-up shaft during an emergency, said means comprising:

a second ratchet wheel which is solidly secured to said take-up shaft and whose ratchet teeth are opposite to that of said first ratchet wheel;

a second pawl to mesh with the second ratchet wheel for stopping the wind-out rotation of the take-up shaft; and

a second sensor for actuating the second pawl in an emergency of the vehicle.

4,173,319

MAGNETIC TAPE CASSETTE

Hiroyuki Umeda, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Division of Ser. No. 750,220, Dec. 13, 1976, Pat. No. 4,091,426.

This application Feb. 15, 1978, Ser. No. 877,956

Claims priority, application Japan, Dec. 13, 1975, 50-168236; Jun. 11, 1976, 51-74969

Int. Cl.[2] G11B *15/32*

U.S. Cl. 242—199 **8 Claims**

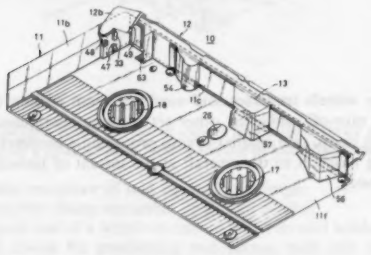
1. A magnetic tape cassette for use in a magnetic recording and/or reproducing apparatus, said cassette comprising:

case means having spaced parallel side walls, a front face, a back wall, and upper and lower panels;

first and second reel means respectively having first and second hubs, said first and second reel means being accommodated in a side-by-side relationship within said case means and between the side walls;

an opaque magnetic tape extending along a tape travel path between the first and second reel means, and having first and second transparent leaders connected from the opposite ends of said opaque tape to the first and second hubs, respectively, to be wound around the first and second reel means;

lid means for covering a part of the magnetic tape on the front face of said case means and for covering the front end portions of the side walls in the vicinity of the front face of said case means;



hinge means mounted respectively on the front end portions of the side walls for enabling said lid means to swing between closed and opened positions to cover or expose the front end portions of the side walls and to cover or expose the part of the magnetic tape on the front face;

means forming a light inlet hole in the lower panel of said case means at a position near the front face and substantially intermediate the first and second reel means; and

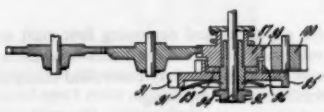
first and second window means forming outlets of light paths extending from said light inlet hole across the tape travel path to said first and second outlet window means, said first and second window means being formed in the front portions of the side walls at positions near said hinge means, and said first and second window means being exposed or covered by said lid means when said lid means is in its opened and closed positions respectively.

4,173,320

DIRECT DRIVE FOR FAST FORWARD AND REVERSE IN TAPE DECK

Etienne A. M. Schatteman, Wemmel, Belgium, assignor to Staar, S.A., Brussels, Belgium

Filed Oct. 10, 1978, Ser. No. 949,524
Int. Cl.[2] G03B *1/04*
U.S. Cl. 242—206 **4 Claims**



1. In a tape transport having a capstan drive for transfer of tape from a supply reel to a take-up reel, a reel drive for a take-up spindle for the take-up reel, and a slipping clutch in said reel drive, said clutch including rotating driving and driven clutch plates, and friction means between said clutch plates for transmitting torque from said driving to said driven clutch plates, the improvements in said tape transport comprising:

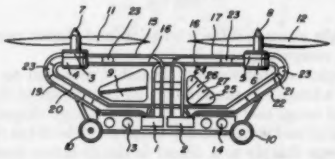
means providing a direct connection between said clutch plates, said direct connection means including gear teeth carried by said driving and said driven clutch plates forming separate gears, a short circuit gear, and means supporting said short circuit gear for movement into and out of engagement with said gears on both said clutch plates and for rotation about a fixed axis when engaged as said clutch plates rotate, to provide a non-slipping and selectively engageable direct connection between said clutch plates.

4,173,321

VEHICLE FOR TRAVELING IN THE AIR AND ON THE GROUND EQUIPPED WITH HYDRAULICALLY DRIVEN PROPELLERS

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Continuation-in-part of Ser. No. 465,413, Apr. 3, 1974, abandoned. This application May 26, 1977, Ser. No. 801,496
Claims priority, application Austria, May 4, 1973, 3968/73
The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.
Int. Cl.[2] B64C *27/08*
U.S. Cl. 244—17.23 **2 Claims**



1. In a vehicle, in combination;

a body structure, a power supply means, a fluid transmission means and at least one propeller;

said body structure including fastening means for holding said power supply means;

said power supply means including at least a pair of independent power supply plants;

said fluid transmission means including at least a pair of pump means comprising a plurality of pumps with separated outlets, at least one fluid motor and at least two fluid flow supply lines from said outlets of said pumps to said at least one fluid motor;

said vehicle including the provision, that said at least one propeller is associated to a rotary portion of said at least one fluid motor as well as the further provision, that each pump of said pump means is associated to one of said power plants separately, said at least one fluid motor includes at least two separated fluid receiving rotors connected to separated inlets, one of said outlets of said pumps connected to one of said inlets and one of said outlets of an other of said pumps connected to the other of said inlets, whereby one of said pumps supplies fluid to one of said rotors to drive said one of said rotors and the other of said pumps supplies fluid to the other of said rotors to drive said other of said rotors;

each of said rotors is hollow and provided with a central rotor hub; said fluid motor includes a shaft; said shaft extends through both of said hubs of said rotors; said shaft is associated to said at least one propeller;

one - way coupling and the opposite way releasing coupling means are provided between said shaft and each of said rotors for the enforcement of releasing one of said rotors from said shaft and for the enforcement of maintaining connection between said shaft and the other of said rotors when one of said fluid flows fails to supply the needed minimum of rate of flow relatively to the rate of flow of the other flow of said flows of fluid in order to assure the continuance of rotary revolution of said at least one propeller when at least one of said power plants and of said flows of fluid fails and also in order to prevent friction

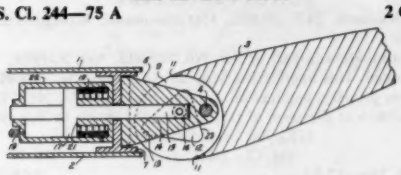
losses which would reduce the efficiency and operation - safety of the vehicles when at least one of said power plants, said pumps and said fluid lines fails to operate with the required accuracy, power and efficiency.

4,173,322

FLUTTER PREVENTION MEANS FOR AIRCRAFT PRIMARY FLIGHT CONTROL SURFACES

Kenneth A. B. Macdonald, Maple Valley, Wash., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 27, 1978, Ser. No. 900,621
Int. Cl.[2] B64C *13/00*
U.S. Cl. 244—75 A **2 Claims**



1. A flight control surface rotation and flutter prevention apparatus, comprising:

(a) a flight control surface, rotatably mounted to a wing about a hinge axis substantially perpendicular to the chord of said wing, said surface having a wedge shaped recess medial of said wing and said hinge axis which has rims that converge sharply to a detent in the direction away from said hinge axis;

(b) a spring return hydraulic actuator fixedly mounted in said wing in confronting relationship to said wedge shaped recess, said actuator having a first operating state in which hydraulic pressures forces said actuator to its extreme of travel and compresses a return spring, and a second operating state in which hydraulic pressure is absent and said return spring forces said actuator to its opposite extreme of travel;

(c) a translating arm, capable of translation in a direction substantially parallel to the wing chord, connected at its first end to said actuator and extending at its second end into said control surface in the region of said recess; and

(d) a means for making contact between said second end of said translating arm and the rims of said wedge shaped recess, said means attached to said second end of the translating arm so that said means is drawn into the detent of the recess when hydraulic pressure is absent, and driven into the wide end of the wedge when hydraulic pressure is present, respectively inhibiting and enabling rotation of the flight control surface about its hinge axis.

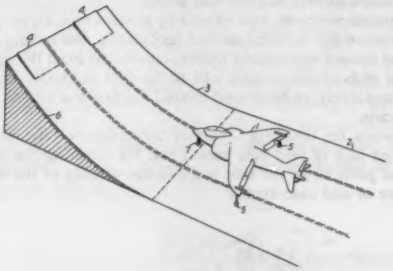
4,173,323

AIRCRAFT LAUNCHING TECHNIQUES

Douglas C. Thorby, Shepperton, and John Johnson, Chertsey, both of England, assignors to Hawker Siddeley Aviation Limited, England

Filed Jan. 4, 1978, Ser. No. 866,920
Claims priority, application United Kingdom, Jan. 13, 1977, 1391/77
Int. Cl.[2] B64F *1/00*
U.S. Cl. 244—114 R **5 Claims**

1. An aircraft take-off runway for an aircraft having first and second sets of undercarriage wheels the second set being spaced both laterally and longitudinally of the aircraft from the first set, said runway having a terminal ramp that curves upward toward its end to launch the aircraft in a semi-ballistic trajectory, and further comprising at least one auxiliary ramp section upon the end portion of the main ramp and forming part of the runway surface which auxiliary ramp section has in the longitudinal direction of the ramp a different slope from the main ramp with the difference in the spacing between the surface of the auxillary ramp and the main ramp increasing as the end of the main ramp is approached; said auxiliary ramp section occupying only a part of the width of the main ramp at a position where only one of said first and second sets of under-



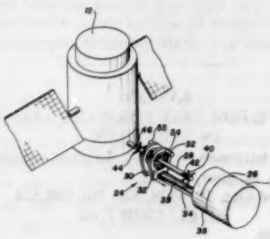
carriage wheels traverses said auxiliary ramp section during aircraft take-off while the other set remains contiguous with the main ramp, said auxillary ramp providing a predetermined pitching moment to the aircraft at the instant of launch from the runway.

4,173,324

COUPLING DEVICE FOR MOVING VEHICLES

Arthur A. Rudmann, Bowie, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 19, 1978, Ser. No. 907,436
Int. Cl.[2] B64D *9/00*; B64G *1/00*
U.S. Cl. 244—161 **14 Claims**

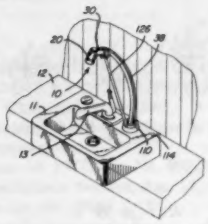


1. A system for capturing and deploying first craft means having motion relative to a second craft means wherein said second craft means includes remotely controlled manipulator apparatus, the combination comprising:

outwardly projecting end receptor means located on said first craft means; and

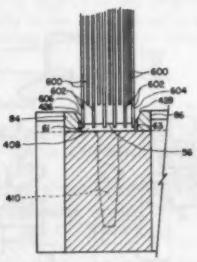
end effector means including a collapsible iris assembly coupled to the manipulator apparatus and operated from said second craft means through said manipulator apparatus, said iris assembly having a pair of axially movable independently operable iris mechanisms, each of said iris mechanisms having a plurality of iris elements adapted to be positioned around said end receptor means and upon command being operable to close and open for respectively engaging and releasing said end receptor means.

4,173,325
SPRAYER
John E. Petrovic, Ft. Collins, Colo., assignor to Teledyne Industries, Inc., Ft. Collins, Colo.
Division of Ser. No. 861,166, Dec. 17, 1997. This application Jan. 16, 1979, Ser. No. 3,919
Int. Cl.[2] B05B *15/06*
U.S. Cl. 248—81 **2 Claims**



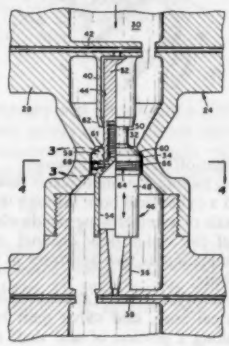
1. A sprayer stand for use in supporting a fluid spray device supplied by a flexible hose from a source of said fluid, comprising:
a holder receptive of said device for storage;
a releasable clamp securable upon said device;
a support rod of a length to extend between said holder and said clamp for positioning said clamp, with said device therein included, above said holder;
an opening through said holder in which said rod is slidable to accommodate storage of said device;
and an upstanding recess in said holder for seating a lower end of said rod and thereby dispose the upper end of said rod above said holder, said clamp being secured upon said upper end of said rod.

4,173,326
CAST ON MOLD INSERTS
Terry R. Oxenreider, Wernersville, Pa., assignor to General Battery Corporation, Reading, Pa.
Filed Jul. 28, 1977, Ser. No. 819,695
Int. Cl.[2] B22D *19/00*
U.S. Cl. 249—83 **11 Claims**



1. A mold for forming battery straps on substantially parallel and spaced apart rows of positive and negative lugs of a stack of battery elements, comprising:
(a) a mold block having at least two mold channels disposed in a surface of said block to receive said rows of positive and negative lugs, each mold channel having end walls, a portion of which extend beyond the surface of said mold block, each said portion including a segment which is beveled away from said mold channel, the width of each portion extending beyond the width of said channel whereby excess molten lead poured into said channel is prevented from overflowing said end walls and forming projections extending beyond said end walls; and
(b) at least one projection extending from at least one of said end walls into said mold channel, said projection having a width which is less then the width of said channel and a beveled top surface which forms a continuation of the beveled segment of said end wall.

4,173,327
SOLID HANDLING VALVE
William R. Williams, Morgantown, W. Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Filed Jun. 1, 1977, Ser. No. 802,328
Int. Cl.[2] F16K *31/12*
U.S. Cl. 251—31 **5 Claims**



1. A fluid-actuated valve comprising a valve housing having a longitudinally extending throughgoing passageway with a converging segment and a diverging segment therein defining a throat in said passageway with said diverging segment being disposed downstream of said throat with respect to material flow in said passageway, an elongated fluid displaceable piston disposed in said passageway and extending through said throat, means at opposite ends of said piston for movably supporting the piston in said passageway, a conically tapered shoulder carried by said piston with said shoulder having a maximum diameter greater than said throat, seat means defined by a circular lip of a diameter greater than that of said throat with said seat means being disposed adjacent to said throat in said diverging segment and contactable by said shoulder for providing a primary valve closure seal, radially expandable means carried by said piston and contactable with a surface of said valve housing at a location near said seat means in said diverging segment for providing a secondary valve seal, and fluid-actuatable means for expanding said expandable means against said valve housing at said location when said shoulder is contacting said seat means.

3. A fluid-actuated valve as claimed in claim 1, wherein said means at opposite ends of said piston for movably supporting the piston comprise a pair of annular open-ended bosses supported by said housing in said passageway on opposite sides of said throat and extending with the open ends thereof towards one another, fluid passageways are in said housing in registry with the interior of each of said bosses and coupled via valved conduit means to a source of pressurized fluid, one end portion of said piston is disposed within the boss located nearest said converging segment of the housing, the other end of said piston is of an annular configuration defining a receptacle therein of a diameter greater than the other boss located in the passageway on the diverging segment side of said throat for receiving said other boss therein, and wherein the pressurized fluid from said source displaces said piston or maintains the latter at a desired position within said passageway when the pressurized fluid is admitted to a selected one of said bosses.

4,173,328

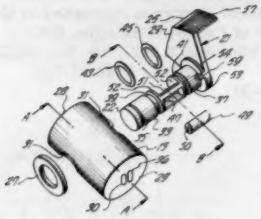
IN-LINE SHUT-OFF VALVE

Richard S. Karbo, Newport Beach, Calif., assignor to The Leisure Group, Carson, Calif.

Continuation-in-part of Ser. No. 718,978, Aug. 30, 1978, abandoned. This application May 5, 1978, Ser. No. 903,179

Int. Cl.[2] F16K *5/00*

U.S. Cl. 251—309 **10 Claims**



1. An in-line shut-off valve comprising:

a valve housing having a straight water flow channel therethrough and a cylindrical bore through the valve housing having its axis of symmetry perpendicular to the axis of symmetry of the water flow channel, said water flow channel terminating as two apertures in the wall of said cylindrical bore;

a valve shaft placed for rotation about its axis of symmetry in said cylindrical bore, said valve shaft having a journal extending along a portion of said shaft and overlapping said apertures in the wall of said bore, said journal having a convex surface of curvature and an elongated concave cavity therein, opposite said convex surface, the cavity being equal in length along said shaft to the length of the journal, water flowing from one aperture to the other around the convex surface in the bore when the valve is open; and

an elongated plug captured by the cavity in said journal, said plug having one side exposed and abutting the wall of said bore, the exposed surface of said plug being of a size to overlap one of the apertures in the wall of the cylindrical bore whereby rotation of said valve shaft causes said plug to slidably engage and seal this aperture.

4,173,329

JACK FOR POSITIONING AND SUPPORTING A MACHINE

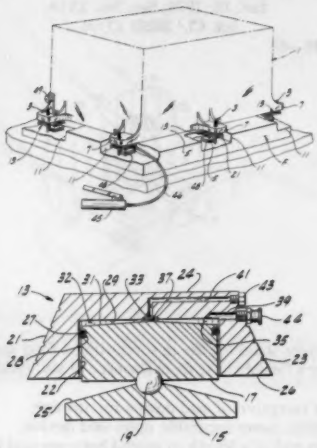
Morris R. Stith, Jr., R.R. #1, Box 13, Webster, Ky. 40176

Division of Ser. No. 725,374, Sep. 22, 1976, Pat. No. 4,100,714. This application May 1, 1978, Ser. No. 901,287

Int. Cl.[2] B66F *3/24*

U.S. Cl. 254—93 R **4 Claims**

1. A jack for positioning and supporting a large, heavy object, such as a machine, on its foundation, said jack being adapted to be surrounded by and embedded in hardenable grout after the object has been properly positioned with one portion of the jack engaging the object and supporting it on the grout after hardening of the grout, said jack comprising a base adapted to be supported on the foundation, a support member having a blind bore therein constituting a cylinder, a piston slidably received in the cylinder, and a ball mounted on the base, the lower end of the piston bearing on the ball to permit limited swivel movement of the piston and support member relative to the base, the portion of the cylinder between the upper end of the piston and the cylinder end wall constituting an expansible chamber adapted to receive a pressurized hydraulic working fluid for effecting upward movement of the support member away from the base, the support member having a pair of opposed end faces, one face being generally flat and constituting an upper end face for engaging said object from below and the other face constituting a lower end face extending out beyond the base and adapted to be supported by the hardened grout, and the support member being tapered from its lower to its upper end face providing a tapered surface convergent from its lower to its upper end face, said surface



being sufficiently rough to mechanically interlock with the hardened grout thereby to inhibit upward movement of the support member with respect to the foundation.

4,173,330

HYDROSTATIC LOAD RELIEF FOR LIFTING SPINDLES

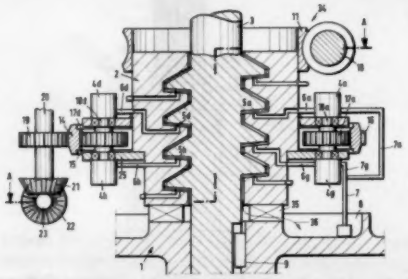
Rolf Goldschmidt, Witten-Annen; Klaus Hänsgen, Witten; Heinz M. Hiersig, Düsseldorf, and Fritz Kirstenpfad, Bad Harzburg, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed May 22, 1978, Ser. No. 908,578

Claims priority, application Fed. Rep. of Germany, May 25, 1977, 2724232

Int. Cl.[2] B66F *3/08*

U.S. Cl. 254—98 **5 Claims**



1. In a lifting device having a threaded spindle to be moved axially for production of a lifting stroke, further having a threaded female member threadedly engaging the spindle and being mounted for rotation, drive means for rotating the female member to move the spindle axially, a hydrostatic relief device, comprising:

oil pockets in load bearing threads of the threaded member;

oil pump means mounted to the member on the outside thereof, there being ducts in the member leading from the pump means to the oil pockets;

pinion means for driving the pump means;

an annular member having internal and external gearing, and being concentrically arranged around the threaded member, the internal gearing meshing the pinion means for driving same;

a gear journalled for meshing the external gear of the annular member; and

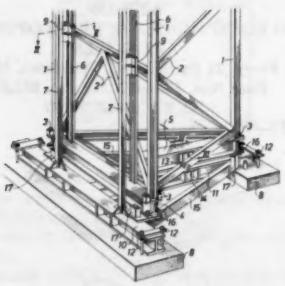
means independent from said drive means for driving the gear to thereby operate the pump means to obtain the hydrostatic load relief.

4,173,331

METHOD AND ARRANGEMENT FOR STAYING CLIMB RODS FOR CO-OPERATION WITH SO-CALLED CLIMBING JACKS

Sören Näslund, Lidkoping, Sweden, assignor to Paul Anderson Industrier AB, Vesteras, Sweden

Filed Jun. 10, 1977, Ser. No. 805,384
Claims priority, application Sweden, Jun. 11, 1976, 7606712
Int. Cl.[2] B66F *1/00*
U.S. Cl. 254—105 **9 Claims**



1. A method of staying climb rods for co-operation with so-called climbing jacks by utilizing masts, each of which climb rods is capable to carry vertical forces transferred via associated climbing jack, while horizontal forces acting on the climb rod are transferred to the staying mast, comprising the steps of supporting the staying mast pivotally at a single pivot point on a footing centrally located beneath the mast permitting the mast to pivot slightly in any direction, and attaching the climb rod slidably to the staying mast so as to render possible relative movements in the vertical direction between the rod and the mast.

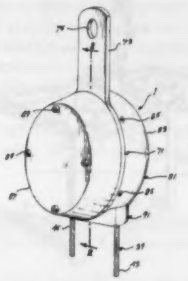
4,173,332

ROTARY SPEED LIMITER DEVICE

Jacques DuLondel, 264, av. Querbes, Outremont, Québec, Canada (H2V 3W2)

Filed Oct. 5, 1977, Ser. No. 839,734
Claims priority, application Canada, Nov. 3, 1976, 264816
Int. Cl.[2] A62B *1/12*
U.S. Cl. 254—160 **1 Claim**

1. A device for lowering a load while limiting its speed of descent, comprising a casing, means for securing said casing to a stationary support, a shaft rotatable in said casing, a pulley secured to one end of said shaft, a cable trained on said pulley and adapted to support a load for lowering the same, the pull exerted by said cable on said pulley casing rotation of said shaft, a rotor mounted on said shaft, means constraining said rotor to rotate with said shaft while allowing reciprocating movement of said rotor axially of said shaft, said casing defining a cylindrical chamber in which said rotor can rotate and reciprocate axially of said shaft, said chamber having a cylindrical surface closely spaced from the periphery of said rotor, said cylindrical surface and the periphery of said rotor having a continuous, sinuous camming groove encircling said shaft, and a radial complementary pin engaging said camming groove, respectively, whereby said pin causes reciprocating axial movement of said rotor on said shaft during rotation of said rotor by said shaft, resulting in a braking force applied to said shaft, and wherein said chamber forms a closed enclosure



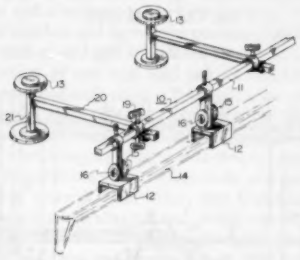
filled with air, whereby said rotor forms a piston compressing the air ahead of the axially moving piston, the compressed air retarding axial movement of said piston and consequently increasing the braking force applied to said shaft.

4,173,333

VARIABLE DESIGN TORCH GUIDE

Dennis Wise, Star Route, Mesa, Wash. 99343

Filed Oct. 11, 1978, Ser. No. 950,304
Int. Cl.[2] B23K *7/00, 7/02*
U.S. Cl. 266—66 **5 Claims**



1. A variable degree guide for a gas cutting torch, comprising:

a main bar;

a pair of arms, each slideably secured in a sleeve which is slideably secured on said main bar; and

means for securing said torch to said guide wherein the longitudinal axis of said torch is in registry with said main bar.

4,173,334

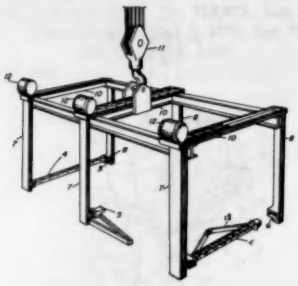
UNMANNED CHAIN HOOK-UP FOR LIFTING LOOSE BUNDLES

Daniel L. Lombard, P.O. Box 177, Youngstown, Ohio 44501

Filed Feb. 23, 1976, Ser. No. 660,263
Int. Cl.[2] B66C *1/12*
U.S. Cl. 294—67 E **2 Claims**

1. In combination with a crane hook, a table-like framework having a top portion suspended centrally by said crane hook and having integral vertical legs depending from the sides thereof, one of which is in the form of a channel, a chain guided in said channel, a motor driven means driving said chain selectively into or out of said channel and underneath the load to be lifted, and means mounted at the bottom of the other leg for automatically locking a free end of said chain thereto, each of the links of said chain having a stop element arranged

to prevent the adjoining interconnected link from pivoting in a downward direction when moved horizontally but allowing it



to be pivoted in an upward direction when retracted into said channel to maintain the unretracted portion of the chain stiff in a horizontal direction.

4,173,335

DRIVE MECHANISM FOR A SHEET FEEDER DEVICE

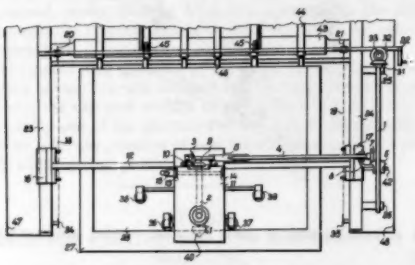
Jaroslav Janecek, Brno, and Jaroslav Jiruse, Blansko, both of Czechoslovakia, assignors to Adamovske strojirny, narodni podnik, Prague, Czechoslovakia

Filed Jun. 24, 1977, Ser. No. 809,803

Claims priority, application Czechoslovakia, Jul. 19, 1976, 4750-76

Int. Cl.[2] B65H *3/08*

U.S. Cl. 271—93 **1 Claim**



1. A sheet feeder drive for transferring paper sheets from a pile thereof to a feeder device by means of pneumatic suckers, comprising:

a pair of spaced apart vertically oriented side walls straddling said pile of paper sheets;

first and second slides mounted adjacent the top edges of respective ones of said side walls;

a horizontal main drive shaft mounted for rotation in bearings affixed to one of said side walls, said drive shaft being disposed adjacent said first slide;

a drive gear rotatably and slidably mounted on said drive shaft;

elongated support means disposed above said pile of paper sheets, connected between said side walls, and slidably coupled to said slides for horizontal movement in a direction parallel to said side walls;

housing means slidably mounted on said support means;

a driven shaft rotatably mounted to said housing means and parallel to said drive shaft;

a driven gear mounted on one end of said driven shaft;

a transmitting gear engaging said driven gear;

a connecting shaft parallel to said support means and extending between said one of said side walls and said housing, said connecting shaft being rotatably mounted to said first slide at one end thereof;

a coupling having a first end slidably coupled to the other end of said connecting shaft and a second end supported by a swing out bearing disposed in said housing, said coupling being connected to said transmitting gear adjacent said second end thereof;

means comprising a guide screw connected between said support means and said housing for effecting movement of said housing in a vertical direction;

chain means for effecting coordinated movement of said first and second slides;

a control shaft rotationally supported by said side walls;

a pair of rollers mounted to said control shaft adjacent opposite ends thereof for driving said chain means;

said drive gear having a circumferential groove on the hub thereof; and

a carrier fixed at one end thereof to said first slide and being forked at the other end thereof, said forked end engaging said groove.

4,173,336

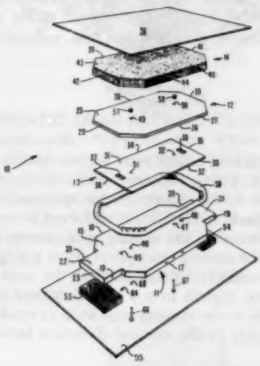
STRIKING EQUIPMENT FOR DEVELOPING MARTIAL ART SKILLS

Robert W. Perry, 21 Patricia Dr., Tyngsboro, Mass. 01879

Filed Nov. 18, 1977, Ser. No. 852,820

Int. Cl.[2] A63B *69/00*

U.S. Cl. 272—76 **17 Claims**



1. A striking board for use in developing one's skill in the martial arts comprising in assembly a relatively inflexible baseboard having planar top and bottom surfaces parallel to one another, a striking surface defined by a first pair of parallel side edges defining a first width of the baseboard, and a second pair of parallel side edges defining a lesser second width of the baseboard, said first pair of parallel said edges being parallel with said second pair of parallel side edges, first and second end portions integral with and extending in opposite directions from said striking surface of said baseboard defined by the said second pair of parallel side edges and defining parallel end edges, a relatively inflexible top board having planar top and bottom surfaces parallel to one another, said top board defined by parallel side edges and having a width coextensive with that of the striking surface of the said baseboard and by parallel end edges defining a lesser length non-coextensive to the length of said baseboard but coextensive with the striking surface, a rectangular shaped spacing member intermediate said top board and baseboard having parallel planar top and bottom surfaces and parallel side edges and end edges defining a lesser width and length than said top board, a relatively flexible cushion member having parallel planar top and bottom surfaces, and being of a width and length so as to be coextensive laterally and longitudinally with said top board and said strik-

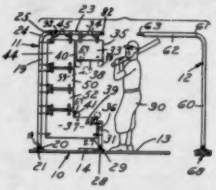
ing surface, and the bottom planar surface of said cushion member being supported by the top planar surface of said top board, a base cover extending over the bottom surface of the baseboard and being secured by means on the top surface thereof, a top cover extending over the top surface of the said flexible cushion member and being secured by means to the bottom surface of the top board, a seam comprising a material folded in half secured to said bottom surface of the top board around and along its perimeter, and means securing said baseboard, spacing member and top board in assembly together, said seam in the assembly being located around the perimeter of the rectangular spacing member.

4,173,337

BASEBALL BATTING AND PITCHING APPARATUS

Richard L. Okonowski, 32232 Eastway, Roseville, Mich. 48066

Filed Nov. 21, 1977, Ser. No. 853,324
Int. Cl.[2] A63B *69/40*
U.S. Cl. 273—26 A **8 Claims**



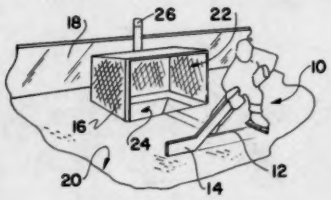
1. In a baseball practice device, the combination comprising:
(a) a baseball home plate,
(b) a first support means mounted adjacent said baseball home plate,
(c) a pad means carried by said first support means and arranged to form a strike zone area opening over said baseball home plate, and which strike zone area opening is enclosed on three sides by the pad means, and open on one side to allow a person to throw balls into said strike zone area opening for baseball pitching practice and a batter to hit balls thrown into said strike zone area opening for batting practice,
(d) a second support means mounted adjacent said baseball home plate; and,
(e) a batter image pad means carried by said second support means and positioned over a batter's box area adjacent the baseball home plate.

4,173,338

GAME SCORE APPARATUS

Robert L. Barnett, 4918 N. Deception Loop, Oak Harbor, Wash. 98277

Filed Oct. 12, 1977, Ser. No. 841,342
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—85 B **9 Claims**



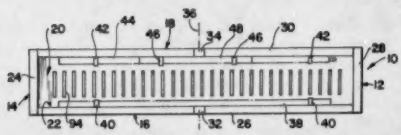
1. In the combination of a miniature hockey game apparatus having miniature hockey like playing figures disposed over a playing surface and a goal area, such playing figures being manually moveable, a puck for engagement with a hockey stick carried by said figures, the improvement comprising said board having an opening therein, said opening being disposed adjacent said board, means to detect the dropping of said puck through said opening, means to store said puck over said playing surface, means to detect the presence of said puck in said position over said playing surface, means to dispense said puck onto said playing surface after the expiration of a time interval following the placement of said puck in said position over said surface, a time indicating display, means to enable the operation of said time display when said puck descends downwardly towards said playing surface, means to disable said time display when said puck passes through said opening.

4,173,339

PEG GAME APPARATUS

Violet Crompton, 125 Navenby Crescent, Weston, Canada (M9L 1B3)

Filed Jan. 13, 1978, Ser. No. 869,227
Int. Cl.[2] A63B *71/00*
U.S. Cl. 273—95 R **8 Claims**



1. A peg game apparatus comprising a box, said box having side walls and a base, said side walls defining an open-mouth portion of said box and an interior portion of said box, a pair of notches, each of said pair of notches extending into said open-mouth portion of said box, said pair of notches aligned and disposed opposite each other, a first rod, a second rod, a third rod, means to removably secure said first rod and said second rod and said third rod within said box, said means to removably secure including a plurality of U-shaped clips, each of said U-shaped clips having a pair of free ends, said pair of free ends being biased towards each other, said U-shaped clips being secured to said side walls, one end of said second rod having a first plurality of threads located on an exterior surface thereof, one end of said third rod having a hole, said hole having the longitudinal axis thereof disposed coaxially aligned with the longitudinal axis of said third rod, a second plurality of threads located within said hole and complementary shaped to said first plurality of threads, said first rod having a shorter length than said second and said third rods, said box being configured to entirely contain said first and said second and said third rods within said interior portion of said box when said first and said second and said third rods are secured to said means to removably secure, said notches being a distance apart less than the length of said first rod, whereby said second rod and said third rod are removably secured to one another utilizing said first and said second plurality of threads therefor and whereby said second and said third rods when removably secured together define an elongated rod having a length greater than the largest dimension of said box.

4,173,340

GAME STRUCTURE HAVING A TETHERED BALL

Hideyuki Kanno, Gardena, Calif., assignor to Tomy Corporation, Carson, Calif.

Filed Mar. 28, 1978, Ser. No. 890,907
Int. Cl.[2] A63B *71/04*
U.S. Cl. 273—95 A **4 Claims**

1. A structure useful in playing a game, said structure including a base, a support having an upper end attached to said base so as to extend upwardly from said base, a tether having ends, connecting means connecting said upper end of said support to

one end of said tether and a ball secured to the other end of said tether in which the improvement comprises:

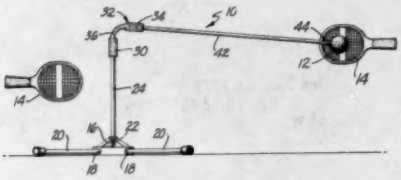
said tether comprising an elongated rod,

said connecting means comprising a hinge member having ends and a flexible portion located intermediate said ends of said hinge member,

one of said ends of said hinge member being secured to said upper end of said support so as to be incapable of movement relative to said support,

the other of said ends of said hinge member being secured to the first mentioned end of said tether,

said flexible portion of the hinge member being shaped so as to permit bending between said ends of said hinge member



and so as to permit said ends being twisted relative to one another no more than about 90 degrees when said ends are located so as to be in alignment with one another, said flexible portion permitting twisting between said ends when said ends are not located in alignment with one another,

said flexible portion is a substantially flat, rectilinearly shaped strip of material having ends, said strip being sufficiently thin so as to be capable of bending between said ends and said strip, the distance between the side edges of said strip being no greater than the distance between the ends of said strip so that the dimensions of said strip serve to limit the amount that said flexible portion may twist.

4,173,341

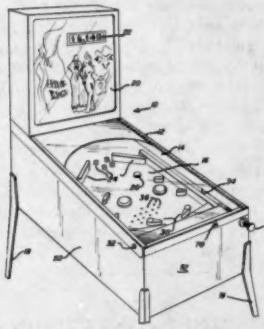
AMUSEMENT DEVICE USING PERFORATED BOARD

William E. Olliges, Barrington Hills, Ill., assignor to George H. Gerstman, Northbrook, Ill.

Continuation of Ser. No. 707,687, Jul. 22, 1976, abandoned. This application May 18, 1978, Ser. No. 906,910

Int. Cl.[2] A63F *3/00*

U.S. Cl. 273—126 A **10 Claims**



1. An amusement device of the pinball type comprising:

a game piece;

a housing having a transparent cover member;

a board having an inclined surface visible through said transparent member and carrying score sensing apparatus for actuation by said game piece moving over said inclined surface;

means for supplying an air cushion through said board for supporting said game piece above said board on said air cushion and enabling said game piece to move along said inclined surface under the influence of gravity;

means carried by said housing at a fixed location for enabling said game piece to be moved upwardly along said surface and against the influence of gravity; and

means for recirculating said air.

4,173,342

DEVICE FOR SIMULATING A CARD GAME

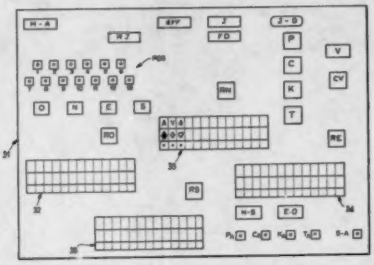
Jeanne De Corlieu-Ferran, 1 rue Scheffer, 75016 Paris, France

Filed Apr. 13, 1978, Ser. No. 896,335

Claims priority, application France, Apr. 29, 1977, 77 12986

Int. Cl.[2] A63B *71/06*

U.S. Cl. 273—148 R **14 Claims**



1. A device for simulating a game of cards which takes place between a number of players in successive tricks and especially a game of bridge, comprising a number of information panels corresponding to the number of players simulated in the game, provision being made on each panel for a number of positions corresponding to the number of cards held by a player at the beginning of a game, and further comprising dealing means for displaying or said information panels any predetermined combination of cards corresponding to any predetermined deal and playing means for individually modifying the information loaded in each position aforesaid in order to indicate that the corresponding card has been played, wherein the playing means for indicating that a predetermined card has been played comprise a first set of control keys each corresponding to one of the information panels, a second set of control keys each corresponding to one of the positions in each information panel and an address coding register connected to both sets of keys aforesaid in order to define the predetermined card by means of its information panel and its position in said panel.

4,173,343

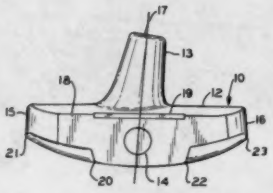
MALLET PUTTER

Vincent J. Richilano, Lakewood, Ohio, assignor to Zephyr Industries, Inc., Lakewood, Ohio

Filed Jun. 7, 1976, Ser. No. 693,175

Int. Cl.[2] A63B *53/04*

U.S. Cl. 273—169 **8 Claims**



1. A mallet type putter comprising:

a shaft having a center line extending between opposite ends;

a head secured to one end of said shaft, having a striking

face, and being constructed of a metal with a specific gravity less than 3 and a single heavy core with a specific gravity of at least 7 to provide a sweet spot for the head;

said heavy core being at the sweet spot, extending rearwardly from the striking face and having a front and a rear end;

said center line of said shaft passing through the sweet spot for the head and through said core thereby reducing chances of twisting the putter while in the hands of a golfer;

said core having a substantially greater axial length perpendicular to the striking face than width parallel to the striking face;

the center of gravity of the putter head being rearwardly displaced from the striking face;

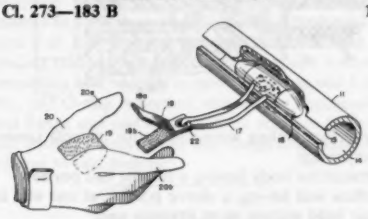
the front end of said core being on and constituting a part of the striking face of the putter, and said core being rigidly secured within the head, whereby the sectional density of the core provides improved trajectory for a golf ball with reduced wobble.

4,173,344

GOLF SWING TRAINING DEVICE AND METHOD

Torsten A. Angshed, 2221 W. 120th Pl., Blue Island, Ill. 60406

Filed May 24, 1978, Ser. No. 908,940
Int. Cl.[2] A63B *69/36*
U.S. Cl. 273—183 B **10 Claims**



1. A golf swing training device comprising an arcuate guide member having the outline of the predetermined path of movement of a golfer's hands in the execution of a prescribed golf swing, means supporting said guide member along an inclined plane parallel with the path of movement of a golfer's hands during such a swing, said arcuate guide member defining a channel therealong, a rider freely movable along said channel but being restrained against lateral release therefrom, means adapted to be worn upon at least one of a golfer's hands, and strap means secured at one end to said rider and being connected at the opposite end thereof to said means adapted to be worn upon at least one of the golfer's hands for guiding movement of the golfer's hands in the execution of said golf swing.

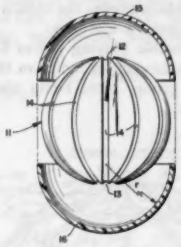
4,173,345

GOLF BALL

Terence W. Pocklington, Tupelo, Miss., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Jun. 26, 1978, Ser. No. 919,381
Int. Cl.[2] A63B *37/02*
U.S. Cl. 273—217 **7 Claims**

1. A compression molded golf ball consisting of an elastic spherical core having a plurality of angularly related shallow surface channels all lying on the paths of great circles passing through opposite poles on the core surface and a relatively thin cover of durable synthetic plastic material the inner surface of



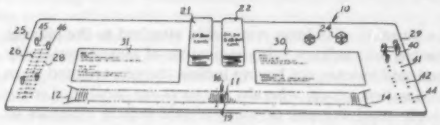
which envelopes said core surface and conformally completely occupies said channels.

4,173,346

BOARD-TYPE GAME SIMULATING FOOTBALL GAME

William D. Godwin, 2812 Roswell La., Columbus, Ga. 31906

Filed Aug. 15, 1977, Ser. No. 824,449
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—247 **2 Claims**



1. A football game apparatus for simulating a game of football and including a board representing a football playing field and having a plurality of locations indicated thereon, first marking means representing a football, a first goal towards which a first player having possession of said football attempts to move said football, a second goal towards which a second player having possession of said football attempts to move said football, a plurality of random selecting means for indicating plays for determining movement of said football through said plurality of locations, and means for determining segments of the game comprises a first counting means for counting the times said first player has possession of said football, said first counting means including a first plurality of pegs, a first plurality of groups of holes defined in said board for receiving said first plurality of pegs, each group of holes of said plurality of groups of holes representing one of said segments of the game, and a second counting means for counting the times said second player has possession of said football, said second counting means including a second plurality of pegs, a second plurality of groups of holes defined in said board for receiving said second plurality of pegs, said second plurality of groups of holes being generally parallel to and aligned with said first plurality of groups of holes, each group of holes of said second plurality of groups of holes representing the same segment of the game as the adjacent group of said first plurality of groups of holes.

4,173,347

GAME BOARD AND PIECES HAVING REMOVABLE INDICIA

Ernest R. Field, II, 407 Tulip Ave., Takoma Park, Md. 20012

Filed Jun. 25, 1976, Ser. No. 697,342
Int. Cl.[2] A63F *3/02*
U.S. Cl. 273—261 **3 Claims**

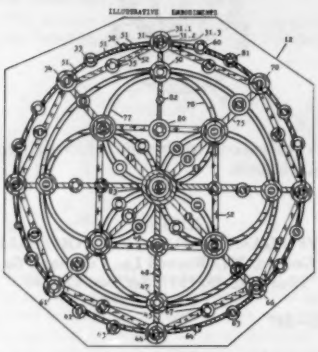
1. A game apparatus for two or more players comprising:

(a) a playing surface, upon which a plurality of spaced-apart

spots are located, which can be occupied by movable playing pieces and by removable indicia elements;

(b) a plurality of indicia elements containing indicia thereon selected from an indicia group, the indicia group containing a plurality of distinctive indicia;

(c) a plurality of movable playing pieces for each player, each playing piece having an indicium thereon selected from said indicia group, there being playing pieces of various indicia; and



(d) a plurality of indexes removably attached to the playing pieces, said indexes being indicative of player ownership and said indexes not having indicia thereon selected from said indicia group; whereby the spots are capable of selectively receiving one or more of said indicia elements so that certain of the spots contain one indicium element while the remaining spots contain various pluralities of indicia elements and so that there are different indicia elements at said remaining spots in a specified hierarchy of order.

4,173,348

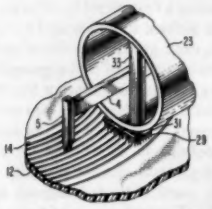
GROOVED RECORD PLAYBACK SYSTEM

Anil R. Dholakia, East Windsor, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 20, 1978, Ser. No. 898,435

Int. Cl.[2] G11B *3/58*

U.S. Cl. 274—47 **7 Claims**



1. A pickup apparatus for use with a disc record having an information bearing spiral groove disposed on the surface thereof; said apparatus comprising:

(A) A first record engaging means comprising a playback stylus having an elongated rigid element tapering to a tip at one end thereof, which tip is dimensioned for reception within said groove during playback; said first record engaging means subject to radial motion toward the center of said record playback;

(B) A pickup arm carrying said first record engaging means at one end thereof;

(C) A second record engaging means separate from said first record engaging means; said second record engaging means subject to radial motion toward said record center independent of said radial motion of said first record engaging means during playback;

(D) A separate support arm carrying said second record engaging means at one end thereof; and

(E) Means for supporting said pickup arm and said support arm in a manner permitting variation in the separation between the radial location of said first record engaging means relative to the radial location of said second record engaging means during playback; said support arm being subject to engagement with said pickup arm when said radial separation between said first record engaging means and said second record engaging means exceeds a predetermined distance; said radial motion of said first record engaging means tracking said radial motion of said second record engaging means during the period of said arm engagement.

4,173,349

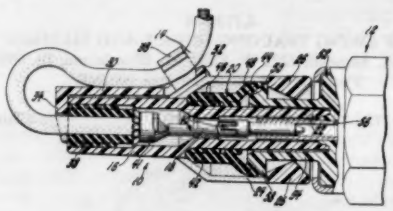
CONNECTOR INTERFACE SEALING ARRANGEMENT

Frank T. Neale, III, Warren, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 24, 1978, Ser. No. 936,199

Int. Cl.[2] F16J *15/32;* **H01R** *3/04*

U.S. Cl. 277—6 **3 Claims**



1. An interface sealing arrangement for matable connector bodies comprising:

a first connector body having a tubular end portion,

an interface seal having a sleeve portion at one end and a biconic head portion at an opposite end,

said sleeve portion sealingly engaging a peripheral surface of the tubular end portion and said biconic head portion terminating in a converging end section radially spaced from the tubular end portion, and

a second connector body including a shroud having a conical ramp at one end,

said conical ramp engaging and folding the converging end section back toward a diverging section of the biconic head portion when said connector bodies are mated.

4,173,350

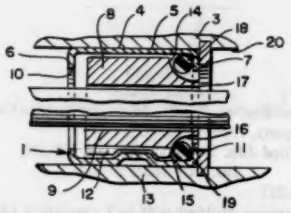
FLOATING SEALS

Leonard J. Sieghartner, Coal Valley, Ill., assignor to Roy E. Roth Company, Rock Island, Ill.

Filed Aug. 7, 1978, Ser. No. 931,499

Int. Cl.[2] F16J *15/16*

U.S. Cl. 277—40 **9 Claims**

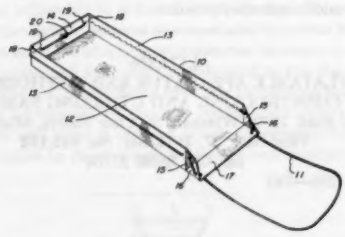


1. A seal for mounting in a portion of a casing in sealing

relation with a shaft rotatably supported in said casing for inhibiting flow of pressurized liquid through said portion of said casing, axially of said shaft, from one position in said casing to another position in said casing, said seal comprising:

a. a housing comprising
   (1) a tubular outer wall, and
   (2) and an annular flange projecting substantially radially inwardly from one end of said outer wall,
b. said housing being adapted to be mounted in said portion of said casing in sealing relation thereto with
   (1) the end of said outer wall remote from said flange facing toward said one position, and
   (2) the axially outer face of said flange facing toward said other position,
c. an annular bushing mounted in said housing,
d. said annular bushing having
   (1) an opening therethrough of a size to receive such a shaft therein with a closely fitting loose fit,
   (2) an annular outer surface of a size to fit in said outer wall with a looser fit than said first mentioned fit, and
   (3) a recess, of arcuate cross sectional shape, extending annularly around said bushing and formed in one outer annular corner of said bushing,
e. said recess opening outwardly toward the junction of said outer wall with said flange,
f. a resilient O-ring mounted in said recess and extending therearound between said bushing and said flange,
g. said O-ring having a lesser thickness than the length of the chord of said arc,
h. said bushing having an elongated slot formed in the outer periphery thereof and disposed in substantially parallel relation to the longitudinal axis of said bushing,
i. means on said housing and extending into said slot for holding said bushing against rotation in said housing while permitting said bushing to move axially in said housing so that said O-ring is pressed into sealing engagement with said flange and said outer wall by pressure on the side of said bushing remote from said flange in an axial direction relative to said bushing.

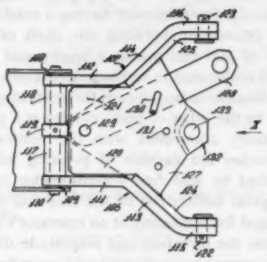
4,173,351
LAWN LITTER SLED
Philip R. Hetland, 915 River Dr., Moorhead, Minn. 56560
Filed Sep. 11, 1978, Ser. No. 941,054
Int. Cl.[2] B62D *15/00*
U.S. Cl. 280—19 **7 Claims**



1. A lawn litter sled comprising:

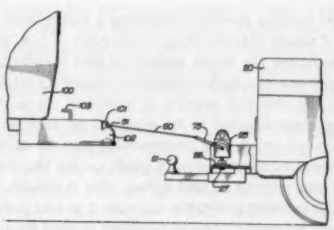
a carrying body including a bottom panel, a substantially vertical end panel and side panels hinged to said bottom panel, a loading panel extending between said side panels and movable between a substantially vertical and a substantially horizontal position, cord guide means for guiding a flexible cord, flexible cord means frictionally held in at least one cord guide means in position to encircle the end and side panels of the carrying body, wherein said cord means provides lateral support to said side and end panels, said cord means also comprising a tow rope to drag said sled along the ground.

4,173,352
COMBINATION ARTICULATED TRACTOR AND TOW CAR
Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland
Filed Oct. 18, 1976, Ser. No. 733,373
Claims priority, application Netherlands, Oct. 16, 1975, 7512128
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—415 A **5 Claims**



1. A tow bar assembly for use on large tractors wherein heavy forces having horizontal components are exerted by implements connected to the tractor's hitch, said tractor having a lifting device which includes a pair of outwardly diverging arms, said assembly comprising an integral supporting plate adapted to be detachably mounted rigidly between said arms in a substantially horizontal disposition, a coupling member for towing loads pivotally connected to said plate, said supporting plate including securing means for said coupling member outward relative to its pivotal connection to said supporting plate whereby said coupling member may be affixed relative to said supporting plate in a plurality of different positions, a further supporting plate being located parallel to said first mentioned supporting plate and secured rigidly thereto, said coupling member being between said supporting plates are pivotally connected to each said supporting plate, said securing means extending from one said supporting plate to the other said supporting plate, said supporting plates including a pair of supporting members rigidly connected to each of said plates on both sides thereof, said supporting members bearing against said arms and being connected thereto, said arms having closing plates attached thereto which extend toward each other and are adapted to be received between said supporting plates.

4,173,353
TOWING HITCH ALIGNMENT DIRECTOR
Richard W. Steele, 6551 Dume Dr., Malibu, Calif. 90265
Filed Mar. 17, 1975, Ser. No. 559,036
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—477 **3 Claims**



1. In combination with a pair of vehicles having complementary hitches each mounted axially of its vehicle and capable of relative pivotal movement about a vertical axis when engaged; a director for sensing relative alignment of the axis of one of

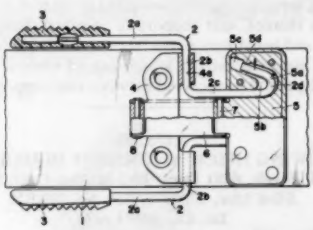
said vehicles with respect to a line intersecting said hitches, comprising a transducer unit mounted on one of said vehicles in a position on its axis forward of said vehicle's hitch; said unit comprising a first potentiometer having a vertically disposed rotatable shaft extending therefrom; reel means carried by said shaft including spring means for rotating said reel means in one direction, an extensible sensor carried by said reel means and having a free end extensible therefrom; said sensor being effective upon extension thereof to rotate said reel in the opposite direction, a second potentiometer having a rotatable shaft and an operating connection between the shaft of said second potentiometer of said reel means whereby said shaft will be rotated by said reel means in response to extension and retraction of said extensible sensor; means for anchoring the free end of said sensor to the other of said vehicles at a position on its hitch substantially coincident with the vertical axis about which said hitches are capable of pivoting when engaged, means controlled by said first potentiometer in response to horizontal angular deflections of the free end of said sensor when so engaged for indicating at an operator's station of one of said vehicles, the direction and magnitude of said angular movement, and means controlled by said second potentiometer in response to extension and retraction of said sensor for indicating at said station the magnitude of such extension.

4,173,354

SKI BRAKING DEVICE

Masahiro Murata, Matsudo, Japan, assignor to Hope Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1978, Ser. No. 893,307
Claims priority, application Japan, Apr. 11, 1977, 52/40464
Int. Cl.[2] A63C 7/10
U.S. Cl. 280—605 **8 Claims**



1. A ski braking device comprising a spring wire, the front portion of which extends along a side edge of a ski plate and is extensible below the lower surface of said ski plate, the intermediate portion of which is rotatably supported relative to said ski plate, the rear end portion of which is elastically bent, a mounting plate adapted to be attached on said ski plate and rotatably supporting said intermediate portion of said spring wire, a pedal member having a guide cavity therein in which said rear end portion of said spring wire is slidably provided, and an arm member pivotably connected to said pedal member and to said mounting plate at positions spaced from the rotatable support of the intermediate portion, such that when said pedal member is pushed down by a sole of a ski boot, said pedal member is moved relative to said rear end portions of said spring wire to deform the bent shape thereof and to allow an elastic strain energy to be retained at the deformed rear end portion thereof.

4,173,355

FOLDABLE BABY CARRIAGE WITH FOLDABLE AND ADJUSTABLE FOOT REST

Giuseppe Perego, via de Gasperi, Arcore (Milano), Italy (20043)

Filed Jan. 26, 1978, Ser. No. 872,368
Claims priority, application Italy, Oct. 7, 1977, 28356 A/77
Int. Cl.[2] B62B 7/06
U.S. Cl. 280—642 **10 Claims**

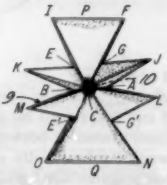
1. In a folding carriage adapted to fold between an operative position and an inoperative folded position wherein said carriage is narrowed in width and shortened in height, said carriage having front and rear legs pivotally connected together, a front wheel on each of said front legs and a rear wheel on each of said rear legs, a pair of elongated handles, an upper sleeve attached to a respective one of said front legs and slidably mounted on each of said handles, a lower sleeve slidably mounted on a respective one of said front legs and attached to a respective one of said handles, an actuating knob, first and second tie rods connecting the upper sleeve to said actuating knob, seat means including a foldable seat and associated foldable seat back, each adapted to fold between operative and inoperative positions, and a pair of generally U-shaped arm rests, each having one end connected to a respective one of said handles and the other end connected to the corresponding one of said lower sleeves, the improvement comprising: foot rest means comprising two side pieces, each connected to a respective one of the arm rests, a central piece, and means pivotally connecting said central piece to said side pieces so that said foot rest means is foldable generally centrally; and support means operatively connecting said side pieces to said lower sleeves for enabling said foot rest means to be automatically folded to be narrower when said carriage is folded toward said inoperative position.

4,173,356

INFLATABLE APPARATUS AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Tsuneyo Ross, 22301 Winshall, St. Clair Shores, Mich. 48081

Filed Mar. 27, 1974, Ser. No. 455,192
Int. Cl.[2] B60R 21/08
U.S. Cl. 280—743 **3 Claims**



1. A safety bag adapted to be inflated in a vehicle in order to cushion an occupant of the vehicle, said safety bag having a deflated, folded condition and an inflated, unfolded condition, said bag when in said deflated folded condition comprising:

a plurality of adjacent accordion pleats whose fold lines radiate from a central point of the deflated bag, said fold lines converging at the central point and diverging at the opposite end, such that said pleats are circle-sector shaped, said bag being mounted on said vehicle at said central point.

4,173,357

INSTALLATION FOR ADJUSTING THE HEIGHT OF THE UPPER ANCHORING OR DEFLECTION POINT FOR THE SHOULDER BELT OF A BELT SYSTEM

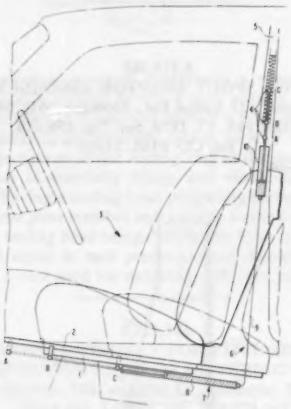
Walter Jahn, Sindelfingen, and Jurgen Gimbel, Gechingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 3, 1977, Ser. No. 803,384

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1976, 2625417

Int. Cl.[2] B60R *21/00*

U.S. Cl. 280—808 **22 Claims**



1. An installation for the height adjustment of a point consisting of one of upper anchoring and deflection point, for a shoulder belt of a belt system in a vehicle, including individual seat means adjustable in at least one of two directions consisting of horizontal and vertical direction, characterized by transmission means operatively interconnected between a respective seat means and said point coordinated to the seat means, said transmission means being operable to displace said point during an adjustment of the seat means such that a height location of said point is realized which is favorable for a belt user in relation to the respective adjusted seat position.

4,173,358

ACCESSORY CLIP AND PAGE SEPARATOR FOR NOTEPADS AND THE LIKE

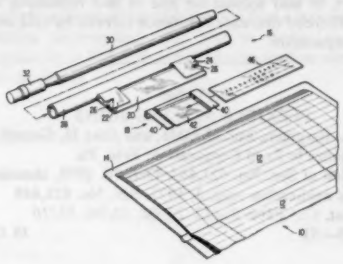
Richard C. Wilson, P.O. Box 26, Champlin, Minn. 55316

Filed Feb. 23, 1978, Ser. No. 880,396

Int. Cl.[2] B42F *1/00*

U.S. Cl. 281—45 **13 Claims**

1. An accesory clip assembly for a pocket-carried notepad article or the like comprising a clip having means for detachably securing the same to a portion of a said article, a tubular member affixed to said clip for reception therewithin of a writing instrument, said clip including cooperating base and tab members for gripping a said article portion therebetween to prevent accidental dislodgement thereof from the article, wherein said tab member has a sharpened tang depending therefrom and extending toward said base member whereby



the same fricitionally engages with a said article with the tang biting thereinto.

4,173,359

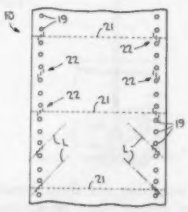
INTERLOCKED CONTINUOUS WEBS

G. Russell Sornberger, Sanborn, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Continuation of Ser. No. 768,189, Feb. 14, 1977, abandoned. This application Mar. 30, 1978, Ser. No. 891,842

Int. Cl.[2] B31F *1/00*; B42D *5/00*

U.S. Cl. 282—11.5 A **2 Claims**



1. In an assembly of continuous webs including at least a pair of superimposed continuous webs having spaced feed holes along at least one marginal edge thereof, longitudinally spaced transverse superimposed lines of weakening in said webs for fan folding the assembly into a zig-zag pack and for separating the assembly into individual units when burst therealong, means comprising sets of interlocking tongues spaced longitudinally along at least said one marginal edge for solely interlocking said webs together, said sets each comprising first superimposed interengaging tongues in said webs and second superimposed interengaging tongues in said webs spaced transversely from and adjacent said first tongues, said tongues being formed by cuts having legs parallel to said marginal edge, said tongues extending in a forward direction of feed of the assembly through a web processing machine having free ends and having opposite ends integral with their respective webs, said sets of tongues being longitudinally spaced apart a first predetermined distance from one another, and said first and second tongues in each said set being transversely spaced apart a second predetermined distance less than said first distance, the improvement comprising, said first tongues and second tongues of each said set being longitudinally spaced apart a third predetermined distance less than said first distance, said free ends of one of said tongues in each said set being disposed forwardly of the other of said tongues in each said set in the direction of feed, whereby said one of said tongues in a first of said sets relative to the direction of feed commences disengaging before said other of said tongues in said first set upon separation of said webs in the direction of feed, and said one of said tongues in a second of said set relative to the direction of feed commences disengaging before said other of said tongues

in said second set upon further separation of said webs, and so on for the remaining sets upon still further separation of said webs, whereby simultaneous disengagement of said tongues in said first set, in said second set and in said remaining sets is avoided to thereby decrease resistance offered by said tongues upon web separation.

4,173,360

FLEXIBLE SEALING JOINT

Lawrence A. Bergman, Euclid, Ohio, and John H. Gorndt, Erie, Pa., assignors to Lord Corporation, Erie, Pa.

Continuation of Ser. No. 621,433, Oct. 10, 1975, abandoned. This application Aug. 3, 1977, Ser. No. 821,448

Int. Cl.[2] F16L *11/12, 27/04, 35/00, 59/16*

U.S. Cl. 285—51 **18 Claims**

1. In a pipe joint assembly for fluid conduits that receive fluid under a pressure greater than an external ambient pressure on the conduits, said assembly comprising

a cylindrical housing including an annular housing body and an annular flange at each end extending radially inwardly of said housing body, and

a pair of tubular members of smaller diameter than said housing, each tubular member including a flange at one end extending radially outwardly of said member, said flanges of the tubular members being disposed between the flanges of the housing and the other ends of the tubular members projecting from opposite ends of the housing for attachment to fluid conduits,

the improvement of two annular joints disposed within the housing, each joint comprising:

(a) a pair of spaced rigid rings, and

(b) an annular flexible element disposed between the rings and sealingly engaging opposed surfaces of the rings so as to define a pair of annular exposed side surfaces of said flexible element, the flexible element including a body of elastomer which when measured substantially normal to at least one of the opposed surfaces of the rings has a tapered thickness between the rings that decreases from the radially innermost side surface to the other side surface of the flexible element, the body of elastomer being closely confined in its tapered configuration along surfaces that extend from the radially innermost side surface to the other side surface of the flexible element so as to resist deflection of the elastomer from between the rings in response to pressure exerted on the radially innermost side surface of the flexible element,

one ring of one joint being in load and motion transmitting engagement with the flange of one tubular member and being sealingly engaged with said one tubular member, one ring of the other joint being in load and motion transmitting engagement with the flange of the other tubular member and being sealingly engaged with said other tubular member, the other ring of each joint being sealingly engaged with a fluid-tight portion of the pipe joint assembly such that the two joints together define at least part of a fluid-tight passageway that interconnects the tubular members to permit a flow of fluid between the tubular members, the joints being oriented such that the radially innermost side surface of each flexible element is exposed to fluid in said passageway and to pressure exerted by fluid in the passageway, the radially innermost side surface being the only side surface of each flexible element which is exposed to fluid in said passageway, each flexible element resiliently accommodating relative motion between the rings that engage the element and providing a fluid-tight seal that is particularly resistant to pressure exerted on the radially innermost side surface of the element.

4,173,361

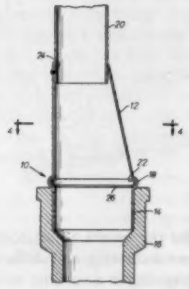
DOWN SPOUT ADAPTOR ASSEMBLY

Stanley J. Gagas, 127 Apline Ter., Shawano, Wis. 54166

Filed Feb. 17, 1978, Ser. No. 878,518

Int. Cl.[2] F16L *55/00*

U.S. Cl. 285—64 **1 Claim**



1. A down spout adaptor assembly for connecting a down spout mounted on the wall of a building to a sewer pipe, said assembly comprising:

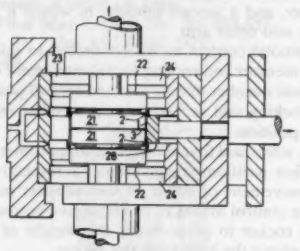
a down spout adaptor including a body portion having a first opening adapted to be connected to the lower end of the building down spout and a second opening, said body portion being tapered outwardly from said first opening toward said second opening whereby said down spout adaptor can be placed against the wall of the building, said second opening being larger then said first opening and asymmetric with respect to the flow axis of said down spout, and an entry adaptor including a cylindrical portion having an opening offset from said first opening and corresponding to said second opening and adapted to be inserted into a sewer pipe,

and means connecting said body portion of said down spout adaptor to said cylindrical portion of said entry adaptor to provide a seal between said adaptors, said means including an arcuate bead around the second opening at the lower end of said body portion, and a corresponding bead around the upper edge of the corresponding opening in said cylindrical portion, said arcuate bead being engageable with the inside surface of said corresponding bead on said cylindrical portion.

4,173,362
FEMALE PIPE COUPLING MEMBER WITH ANNULAR SEAL RING

John B. Glover, Huddersfield, and John Upton, Darfield near Barnsley, both of England, assignors to The Hepworth Iron Company Limited, Stocksbridge, England

Filed Apr. 4, 1977, Ser. No. 784,314
Claims priority, application United Kingdom, Apr. 6, 1976, 13936/76
Int. Cl.[2] F16L *17/00, 21/00*
U.S. Cl. 285—110 6 Claims

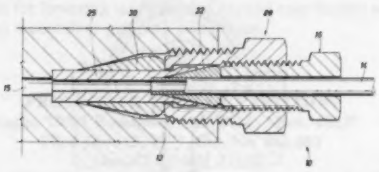


1. A pipe joint member comprising a tubular injection-moulded plastics member having a main portion of a predetermined diameter and at one end thereof a portion of increased diameter defining an inwardly facing annular recess, and a resilient injection-moulded sealing ring in the recess, having a foot portion substantially filling and mould-bonded in the recess and having a sealing head projecting partway across the interior of the joint member and secured to the foot portion by a neck, the sealing head being deformable to an internal diameter at least equal to said predetermined diameter to permit passage of a core used for moulding said joint member.

4,173,363
ADAPTOR ASSEMBLY FOR FITTINGS AND CONNECTIVE LINES OF DIFFERING SIZES

Stanley D. Stearns, 1201 Archley Dr., Houston, Tex. 77055

Filed Jul. 3, 1978, Ser. No. 921,167
Int. Cl.[2] F16L *55/00*
U.S. Cl. 285—177 10 Claims



1. An adaptor for connecting a tubing to a fitting to accommodate a mismatch in size, comprising:

(a) a hollow nut adapted to be positioned around a tubing;

(b) an elongate hollow tubular sleeve having an internal shoulder facing the end of the tubing;

(c) a first tapered spool adapted to be forced into the end of said sleeve by said nut and surrounding said tubing to wedge against the tubing and thereby grip around it;

(d) an elongate coupling having

(1) an axial passage therethrough;

(2) a first set of threads at one end of said passage for engaging said hollow nut;

(3) a second set of threads concentric with said first set for connection to a fitting;

(4) a shoulder facing away from the end at which said hollow nut is threaded to said coupling; and

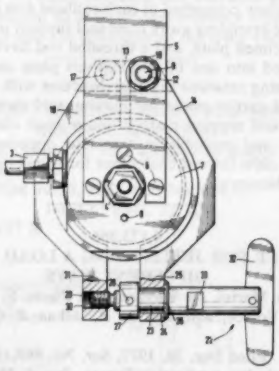
(5) a radial thickness in said coupling defined between the radii of said first and second sets of threads which is at least in part related to the difference in diameter between the tubing and fitting; and

(e) a second and larger tapered spool adapted to be abutted against said shoulder and inserted into a tapered seat in the fitting surrounding said hollow sleeve and wedging against it to grip it in axial communication with a passage in the fitting.

4,173,364
CLAMP ASSEMBLY FOR HIGH PRESSURE DIAPHRAGM TEST CELLS

Wolfgang Hein, Dassel, Fed. Rep. of Germany, assignor to Carl Schleicher & Schull, Einbeck, Fed. Rep. of Germany

Filed Aug. 24, 1977, Ser. No. 827,428
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1977, 2717048
Int. Cl.[2] E05C *19/00*
U.S. Cl. 292—256.67 10 Claims



1. A clamp assembly for a high pressure diaphragm test cell assembly comprising an upper cell part including a wedge flange and a lower cell part including a wedge flange, said clamp assembly comprising:

a carrier frame including means for fixing said frame relative to a stationary support;

means for securing said upper cell part to said carrier frame with the wedge flange of the upper cell part directed downwardly;

a vertical carrier pin mounted on said carrier frame and extending downwardly therefrom;

first and second clamp ring parts mounted at their rear ends to a lower end of said carrier pin for free swinging movement in a horizontal plane;

said clamp ring parts each including clamp surfaces for engaging the wedge flanges of the cell parts; and,

releasable fastening means engaging front ends of said clamp ring parts and extending tangentially relative thereto for forcing said clamp ring parts toward one another to press said cell parts firmly against one another.

4,173,365

CLAMPING DEVICE FOR TRANSPORTING SPECIMEN PLATES

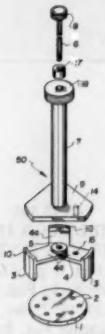
Claude Lieb, Bad Ragaz, Switzerland, assignor to Balzers Aktiengesellschaft fur Hochvakuumtechnik und Dunne Schichten, Liechtenstein

Filed May 26, 1978, Ser. No. 910,084

Claims priority, application Switzerland, Jun. 1, 1977, 006687/77

Int. Cl.[2] B25J *1/00*

U.S. Cl. 294—19 R **10 Claims**



1. A clamping device for transporting a specimen plate, particularly for an electron microscope specimen comprising, a support plate, a carrier plate disposed in juxtaposed relationship with said support plate having at least two resilient arm portions, a claw connected to each resilient arm portion of said carrier plate extending away from said support plate for engaging the specimen plate, and a threaded rod having a threaded end threaded into one of said support plate and said carrier plate and being rotatable in a first direction with respect to said support and carrier plates for moving said carrier plate with respect to said support plate to move each claw away from each other and rotatable in a second opposite direction to move each claw toward each other for engaging the specimen plate therebetween.

4,173,366

DEVICE FOR JETTISONING A LOAD IN TWO DIFFERENT WAYS

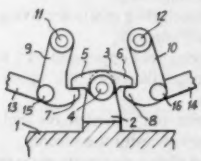
Jean-Pierre Mattei, La Varenne, and Pierre F. Coutin, Paris, both of France, assignors to R. Alkan & Cie., Valenton, France

Filed Dec. 28, 1977, Ser. No. 865,152

Claims priority, application France, Jan. 4, 1977, 77 00061

Int. Cl.[2] B66C *1/28*

U.S. Cl. 294—83 R **5 Claims**



1. A device, for supporting a load from a carrier so as to be jettisonable by each two separate manners of operation of the device, comprising:

(i) a suspension member for securing to the load

(ii) a two-arm rocker mounted pivotably intermediate its ends on said suspension member

(iii) a first support member for mounting pivotably on said carrier, said first support member having a first position in which it is engaged under one of the arms of said rocker, and a second position in which it is disengaged from said one arm

(iv) a first control means connected to said first support member and serving (a) for movement of said first support member into its first and second positions, and (b) for locking said first support member releasably in its first position

(v) a second support member for mounting pivotably on said carrier, said second support member having a first position in which it is engaged under the other of the arms of said rocker, and a second position in which it is disengaged from said other arm

(vi) a second control means connected to said second support member and serving for (a) movement of said second support member into its first and second positions, and (b) for locking said second support member releasably in its first position,

whereby, when said first and second support members are both in their first position engaged under a respective arm of the rocker, movement of either of said support members by its respective control means to its respective second positon permits said rocker to pivot under the weight of the load and thereby release the load from the carrier.

4,173,367

PICKUP UNIT FOR LIFTING CONCRETE BODY

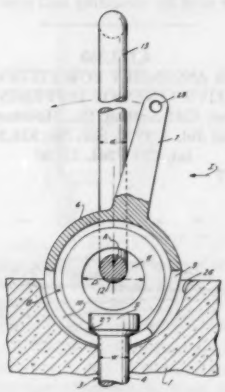
Ernest Haeussler, Grashofstraesse 47, 4300 Essen-Bredeney, Fed. Rep. of Germany

Filed Feb. 28, 1978, Ser. No. 882,249

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1977, 2708787; Mar. 1, 1977, 2708788

Int. Cl.[2] B66C *1/36, 1/66*

U.S. Cl. 294—83 R **13 Claims**



1. A pickup unit for lifting a body from which projects a bolt having a relatively narrow shaft embedded in and projecting from said body and a relatively wide head on said shaft spaced from said body, said unit comprising:

a shackle; and

a pickup member pivotal on said shackle about a pickup axis and having a generally radially extending actuation arm and an angularly elongated and outwardly open pickup slot lying generally in a plane perpendicular to said axis and having a relatively wide end permitting radial passage of said head into and out of said slot and an angularly opposite relatively narrow end internally sufficiently wide to accommodate said head but externally insufficiently wide to permit radial passage of said head out of said slot, said slot being substantially centered on said axis and internally sufficiently wide between said ends to permit

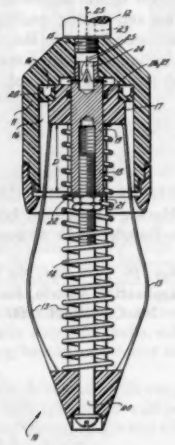
said head to pass angularly along said slot between said ends with said shaft extending out of said slot, whereby said member can pivot about said axis with said bolt engaged in said slot without displacement of said shackle relative to said bolt.

4,173,368

APPARATUS FOR FRICTIONALLY GRIPPING THE INTERIOR SURFACE OF A CONTAINER DURING HANDLING BY AN ARTICLE TRANSFERRING MEANS

Paul J. Haverbusch, Cincinnati, Ohio, assignor to The Lodge & Shipley Company, Cincinnati, Ohio

Filed May 1, 1978, Ser. No. 901,637
Int. Cl.[2] B66C *1/54*
U.S. Cl. 294—88 **6 Claims**



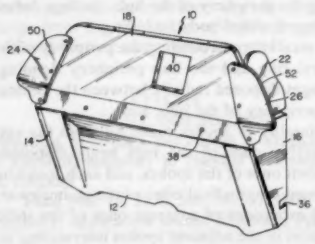
6. A gripping apparatus comprising:
a downwardly opening cup;
a post fixed to the center of said cup and depending therefrom, said post having a lower end beneath said cup;
a piston in said cup;
flexible means connected between the lower end of said post and said piston; and
means for lowering said piston to expand said flexible means into a container gripping orientation.

4,173,369

PROTECTIVE VEHICLE PARTITION

Sam Roggin, 23091 Rosewood, Oak Park, Mich. 48237

Filed Oct. 13, 1977, Ser. No. 841,882
Int. Cl.[2] B60R *27/00*
U.S. Cl. 296—24 R **11 Claims**



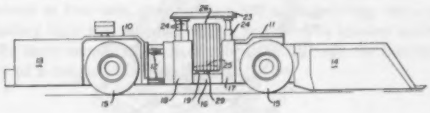
2. A protective vehicle partition comprising a lower panel extending transversely across the lower portion of the vehicle centrally constructed of bullet resistant material, an upper transparent panel having a bottom rigidly secured to the top of the lower panel extending transversely completely across the upper portion of the vehicle constructed of bullet resistant material, upper side panels secured to the ends of the upper transverse panel and extending toward the front of the vehicle, and extensions secured to the ends of the upper transverse panel having free edges with substantially the contour of the inside of the vehicle at the location of the protective vehicle partition extending from adjacent the top of the vehicle to a substantial distance below the rear vehicle door locks.

4,173,370

MINE VEHICLE WITH SWIVEL SEAT

Winford Dillard, Bluefield, W. Va., assignor to A-T-O Inc., Willoughby, Ohio

Filed May 4, 1977, Ser. No. 793,511
Int. Cl.[2] B60R *21/00*
U.S. Cl. 296—65 A **5 Claims**



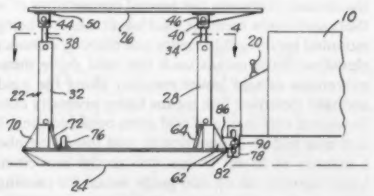
1. In a mine vehicle having operating controls and an operator's position, a partial enclosure defining said operator's position, an entrance way in said partial enclosure and a swivel seat having a high back positioned in said partial enclosure with said high back normally blocking said entrance way and arranged when moved to unblock said entrance way to engage said controls to stop the operation of the mine vehicle.

4,173,371

COMBINATION CAB AND CANOPY FOR MINE ROOF BOLTING MACHINE

Peter P. Kopas, Nicktown, Pa., assignor to Kogen Industries, Inc., Carrolltown, Pa.

Filed Jul. 8, 1977, Ser. No. 814,137
Int. Cl.[2] E21C *11/02*
U.S. Cl. 296—137 R **6 Claims**



1. A combination cab and canopy for a mining machine, which comprises:
cab means having a substantially flat bottom plate with an upstanding rim, for accommodating an operator of said mining machine therein, said plate resting and sliding upon the floor of a mine during use with substantially all of its undersurface area in contact with the mine floor;
canopy means positioned over said cab means for covering said operator;
means for vertically elevating and lowering the canopy means and solely connected to said cab means so that the canopy means is completely supported by said cab means and is not directly connected to said mining machine; and
means for float coupling said cab means to said mining machine for permitting independent vertical and pivotal movements of said cab and connected canopy means with

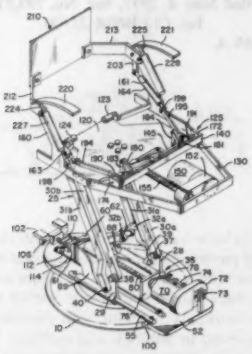
respect to said mining machine during travel along a mine floor, said coupling means comprising at least one vertical support member having an elongated vertical slot formed therein, and a horizontally disposed pivot pin extending through said slot so as to be freely vertically movable therein, one of said pin and support member being fixed on said cab means and the other being adapted to be fixedly mounted on said mining machine.

4,173,372

DENTAL CHAIR

Floyd E. Norris, Seattle, Wash., assignor to Gary Reynolds, Seattle and Harold Y. Tai, Everett, both of, Wash.

Filed Oct. 11, 1977, Ser. No. 840,716
Int. Cl.[2] A61G *15/00*
U.S. Cl. 297—345 **7 Claims**



1. A dental chair, comprising:
a pedestal;
a lifting assembly mounted on the pedestal, said lifting assembly comprising a base, substantially horizontal guide means mounted on the base, elevation link means having first and second ends and being pivotally mounted to the base at its first end, and elevation drive means mounted on the base;
a parallelogram assembly including upper and lower members and a plurality of parallel arms pivotally connected therebetween, the length of said arms being longer than the distance between the pivotal connections of said arms, there said lower member, said lower member being slidably mounted on the guide means and directly connected to the elevation drive means such that said drive means effects movement of said lower member along the guide means, and said elevation link means being pivotally connected at its second end to one of said arms between the midpoint of said arm and its connection to said lower member in such a manner as to act in reaction to the movement of said lower member along said guide means for causing substantially vertical movement of the upper member between raised and lowered positions when the lower member is moved along the guide means;
a seat assembly mounted to the upper member;
a backrest assembly mounted to the seat assembly.

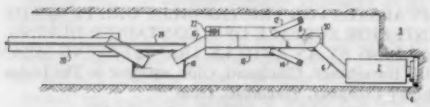
4,173,373

ADVANCE METHOD AND APPARATUS FOR MINING

John A. L. Campbell, Mascoutah, and Daniel J. Moynihan, Belleville, both of Ill., assignors to Peabody Coal Company, Inc., St. Louis, Mo.

Filed Aug. 25, 1977, Ser. No. 827,575
Int. Cl.[2] E21D *20/00*
U.S. Cl. 299—11 **5 Claims**

1. A method of underground mining, comprising continuously mining an entry through material mined by forwardly moving a mining machine into said material, applying roof control means to the entry behind the mining machine by forwardly moving a roof drilling and bolting machine from position-to-position independently of the forward movement of the mining machine, and continuously transporting the material mined by the mining machine by a conveyor running



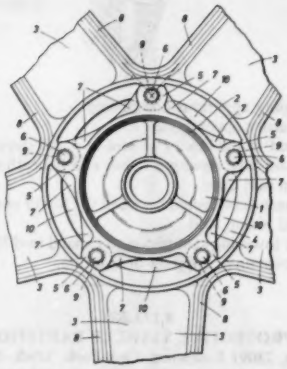
through the roof drilling and bolting machine to a material receiving device behind the roof drilling and bolting machine wherein the conveyor moves extensibly with respect to the mine roof drilling and bolting machine to compensate for difference in advance between the mining machine and the mine roof drilling and bolting machine resulting from the independent movements thereof.

4,173,374

ROAD WHEEL FOR MOTORCYCLES

Peter Resele, and Herwig Leinfellner, both of Graz, Austria, assignors to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria

Filed Apr. 19, 1978, Ser. No. 897,575
Claims priority, application Austria, Jun. 13, 1977, 4134/77
Int. Cl.[2] B60B *1/00*
U.S. Cl. 301—6 CS **3 Claims**



1. A motorcycle wheel comprising
(a) a hub having a periphery, the hub including
(1) peripherally spaced, radially outwardly extending lugs along the periphery of the hub, the lugs defining bores,
(b) an integral wheel body including
(1) a central ring surrounding the periphery of the hub, the central ring and the hub periphery defining air flow passages disposed radially between the central ring and the periphery of the hub, and
(2) a plurality of spokes radiating from the central ring, respective ones of the lugs being disposed between adjacent ones of the spokes, and each spoke having two stiffened longitudinal edge portions, imaginary longitudinal extensions of adjacent ones of the stiffened edge portions of the adjacent spokes intersecting in the bores of the lugs disposed therebetween, and
(c) fastening elements extending through the bores and affixing the central ring of the wheel body to the hub.

4,173,375

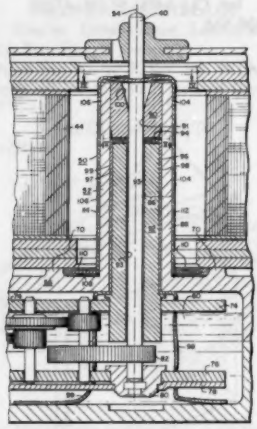
REMOTE LUBRICATION SYSTEM FOR VERTICAL MOTOR SHAFTS

Kenneth G. Halstead, Raleigh, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 14, 1978, Ser. No. 896,415

Int. Cl.[2] F16C *17/00*

U.S. Cl. 308—134.1 **3 Claims**



1. A remotely lubricated support and bearing assembly for extended and vertically rotatable shafts, comprising:

an enclosed housing having an interior reservoir for receiving a lubricant;

an elongated hollow cylindrical wall extending from the top of said housing, said cylindrical wall surrounding a vertical bore extending therethrough and to the interior of said enclosed housing;

a solid bearing member carried by the upper end of said cylindrical wall and including a cylindrical shaft bearing surface aligned with said bore;

a lubricant absorbent washer carried within said cylindrical wall and adjacently below said bearing member;

an internal channel extending through said cylindrical wall between said washer and the interior of said enclosed housing;

a wick extending through said channel for transferring lubricant from said interior reservoir to said absorbent washer so that the lubricant is distributed upward by capillary attraction from said washer to said shaft bearing surface when said shaft is mounted within said bearing member and said bore for rotation about a substantially vertical axis;

a lubricant absorbent retainer mounted outside the bottom of said cylindrical wall; and

a further wick extending over the outer end of said cylindrical wall and around said shaft and further extending to said lubricant absorbent retainer for directing lubricant discharge from the end of the cylindrical wall when the support and bearing assembly is inverted.

4,173,376

BEARING ASSEMBLIES

John M. Standing, Stevenage, and Joseph S. Sheppard, Harlow, both of England, assignors to Hawker Siddeley Dynamics Limited, England

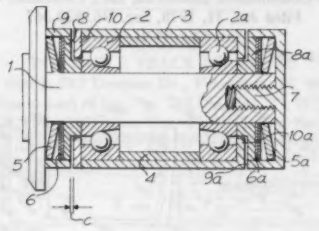
Filed Feb. 16, 1978, Ser. No. 878,618

Claims priority, application United Kingdom, Feb. 17, 1977, 6585/77

Int. Cl.[2] F16C *33/00*

U.S. Cl. 308—189 A **7 Claims**

1. A preloaded bearing assembly including relatively high and low rate spring means acting in tandem, the high rate spring means providing the preload and the low rate spring means accommodating vibration and thermal dimensional changes, said assembly comprising a shaft journalled in two angular contact ball bearings mounted in a housing at opposite ends thereof, the outer races of the bearings being maintained



at a fixed separation distance, and wherein the spring means are disposed in two sets, one out beyond each bearing, each set including high and low rate spring members in tandem acting on the inner race of the adjacent bearing through the intermediary of a respective thrust member.

4,173,377

CHASSIS MOUNTING FOR A MACHINE

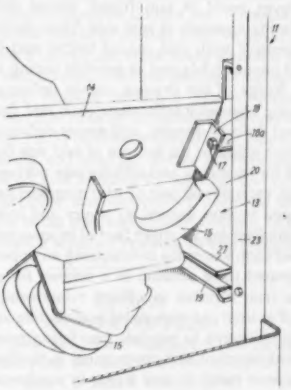
Philip J. Heslop, Wokingham, and Roger J. Matthews, Slough, both of England, assignors to Mars Limited, London, England

Filed Feb. 8, 1978, Ser. No. 876,097

Claims priority, application United Kingdom, Feb. 9, 1977, 5371/77

Int. Cl.[2] A47B *81/00*

U.S. Cl. 312—29 **8 Claims**



1. A machine comprising:

a housing;

an opening in a vertical wall of said housing, said opening providing access to the interior of said housing;

panel means covering said opening, said panel means being movable or removable to expose said opening;

a normally-horizontal chassis mounted in said housing;

working components on said chassis, at least some of the working components being difficult of access when the chassis is in the normal horizontal position;

locating and guiding means for said chassis whereby said chassis is movable between its normal horizontal position within said housing and an inclined position adjacent said opening, the said some working components being adjacent said opening and facing outwardly of the machine when the chassis is in inclined position; and

means for holding the chassis in the inclined position.

4,173,378

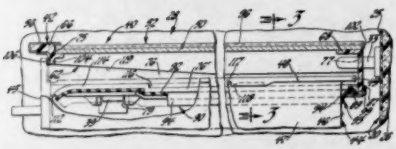
REFRIGERATOR SEALED FOOD STORAGE DRAWER

Robert S. Hanson, Kettering; Paul E. Kronenberger, and Charles C. Whistler, Jr., both of Dayton, all of Ohio, assignors to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Jul. 31, 1978, Ser. No. 929,347

Int. Cl.[2] A47B *88/04*

U.S. Cl. 312—296 1 Claim



1. A supporting frame and cover panel assembly adapted for slidably and sealingly supporting a flanged, imperforate open top food storage drawer between an open position outside the frame providing access to the food therein and a closed position inside the frame providing a generally airtight sealed environment for the food therein; said assembly including a rectangular one-piece frame, a cover panel of similar rectangular shape and a pair of trim members for affixing the cover panel in said frame, said one-piece frame comprising elongated mirror image side frame members interconnected at their ends by front and rear cross frame members, means defining first inwardly facing channels adjacent the top of said side frame members and extending throughout the length thereof for slidably receiving opposite sides of said cover panel therein, shoulder means on said front cross member abutting said cover panel as it is slidably received in said first channels for positioning said cover panel in said frame, means defining second inwardly facing channels in said side frame members substantially coextensive with said spaced below said first channels, said second channels adapted to provide sliding support for an associated flange of the drawer, means defining a third outwardly facing channel intermediate each said first and second channels and defined thereby, and means defining an inwardly facing groove adjacent the bottom of said side frame members configured for receiving and affixing one portion of a seal for said drawer, each of said pair of trim members having a generally C-shaped section formed by upper and lower legs, each upper leg overlapping an upper face of its associated side frame member and each lower leg overlapping an upper wall portion of its associated third channel in a manner for grippingly retaining the trim member in affixed relationship thereto, the upper leg of at least one trim member including an integral stop tab portion operative to provide interfering relationship with the rearward travel of said cover panel in the first channels to lock said cover panel in said frame in conjunction with said shoulder means, a seal support member on said rear cross frame member defining a forwardly facing groove in substantial alignment with the grooves on said side frame members and configured for receiving and affixing another portion of said seal for said drawer, and a seal affixed in the grooves of said side members and said seal support member and substantially coextensive therewith, said seal extending into the path of said drawer when said drawer is moving from its open position to its closed position, whereby when the drawer is in its closed position said seal portions abut the side and rear walls of said drawer in a manner to partially form a generally airtight seal therewith; said front cross frame member including means for effecting a sealed relationship with the front wall of said drawer when said drawer is in its closed position to complete the generally airtight sealed environment for the food in said drawer.

4,173,379

DRAWER, PARTICULARLY FOR A CARD INDEX

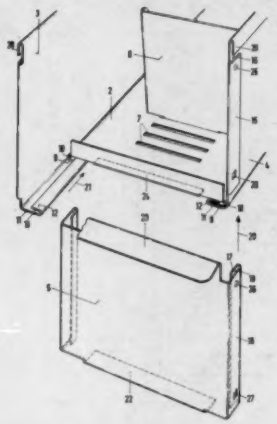
George L. van der Heiden, Bergambachterstraat 3, Schoonhoven, Netherlands, and Karl H. Larsson, Hoornaar, Netherlands, assignors to George Laurens van der Heiden, Schoonhoven, Netherlands

Filed Apr. 21, 1977, Ser. No. 789,618

Claims priority, application Netherlands, Apr. 23, 1976, 7604347

Int. Cl.[2] A47C *88/04, 47/02*

U.S. Cl. 312—330 SM 1 Claim



1. A drawer comprising:

a. an individual bottom panel and first and second pairs of oppositely situated individual wall panels, said second pair of wall panels extending along the length of the drawer, and means for connecting adjacent wall panels together including mutually telescoping portions, in a vertical direction, on adjacent panels, including each telescopic connection comprising a marginal zone on each side of each of said first pair of wall panels bent from the panel through 90° in the direction of the other panel to be connected thereto, and further bent through 180° with a marginal strip being located in a plane substantially parallel to that of said portion bent through 90°, and on each side of each of said second pair of panels a marginal zone bent through 180° outwardly with respect to the panel to be connected thereto, with two bends through 180° being such that the marginal zones are telescoping one into the other with a sliding fit;

b. means for connecting the bottom panel and said second pair of oppositely situated wall panels together including mutually telescoping portions in a longitudinal direction on the marginal adjacent portions of the bottom panel and the second pair of oppositely situated wall panels, each telescopic connection comprising a marginal zone bent from each of said second pair of wall panels through 90° in the direction of the bottom panel, and further bent through 180° with a marginal strip being located in a plane substantially parallel to that of said portion bent through 90°, and on the bottom panel a marginal zone bent through 180° from the bottom panel outwardly with respect to wall panel to be connected thereto, which two bends through 180° being such that the marginal zones are telescoping one into the other with a sliding fit;

c. stops formed on the panels to determine the assembly end position of telescoping of the marginal portions of adjacent panels in the direction of sliding into one another;

d. stop members stopping the telescopic movement of marginal zones of adjacent panels in the sense of sliding out of the assembly end position, said stop members being formed by one or more recessed portions in a marginal

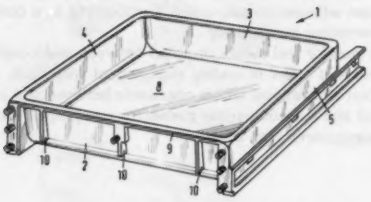
zone of a panel mating with one or more projections in a corresponding marginal zone of the adjacent panel; and

e. one of said first pair of wall panels forming the front of the drawer and being contiguous to the bottom panel with a lip bent through 90° towards the bottom panel, and said bent lip being contiguous to the bottom panel through a self-adhesive strip.

4,173,380
DRAWER ASSEMBLAGE

Hans-Werner Düpree Osnabrücker Landstrasse 154, 4830 Gütersloh 11, Fed. Rep. of Germany

Filed Feb. 27, 1978, Ser. No. 881,858
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1977, 2708167
Int. Cl.² A47B *88/00*
U.S. Cl. 312—330 R **23 Claims**

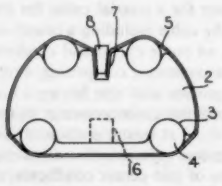


1. A drawer assemblage comprising: a single piece drawer member having a bottom, front and rear walls extending upwardly from said bottom, and first and second sides extending upward from said bottom, each of said sides being formed of an inner wall extending from said bottom and a shorter outerwall parallel to said inner wall and connected to the top thereof; and a ribbed ledge member extending longitudinally in the space between each pair of inner and outer walls, each ledge member comprising a plurality of horizontally spaced vertical ribs, a panel between each pair of ribs, every other panel abutting the inner wall and the remaining panels abutting the outer wall of the pairs, and means for defining a horizontally extending insertion groove positioned below said panels and below the bottom of said outer wall, said groove facing away from said drawer member.

4,173,381
ELECTRICAL CONNECTORS

Reginald H. Allmark, Cheadle, and Norman Bottoms, Wilmslow, both of England, assignors to International Computers Limited, London, England

Filed Feb. 13, 1978, Ser. No. 877,234
Claims priority, application United Kingdom, Feb. 17, 1977, 6638/77
Int. Cl.² H01R *7/08*
U.S. Cl. 339—17 LM **4 Claims**

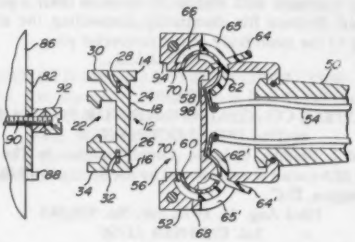


1. An electrical connector including a core comprising at least two resilient elongate members maintained in spaced relationship by a rigid spacing member, a flexible circuit comprising conductive tracks on one surface of a strip of flexible insulating material, the flexible circuit being wrapped around the core so as to cover the resilient elongate members such that the tracks extend substantially circumferentially around the core; a channel having spaced apart walls in the rigid member for receiving the two end regions of the strip; and means separate from the resilient members for simultaneously locking the two end regions of the strip into the channel by pushing the strip end regions against the walls.

4,173,382
PORTABLE TRACK LIGHTING

Donald J. Booty, 513 Durham Dr., Frankfort, Ill. 60423

Continuation-in-part of Ser. No. 763,184, Jan. 27, 1977, Pat. No. 4,099,817. This application Oct. 27, 1977, Ser. No. 845,991
Int. Cl.² H01R *13/60*
U.S. Cl. 339—22 B **13 Claims**

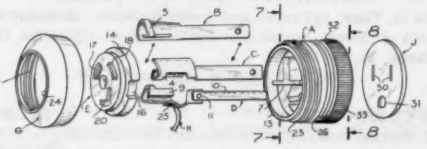


6. Apparatus comprising an elongated track having a recess on a rear face thereof, said track having a pair of elongated spaced electrical conductors with each conductor being accessible from a discrete outside face of the track, bracket means adapted to be rotatably supported by a wall, said bracket means including a locking means which can enter said track recess in one rotative position thereof and releasably lock the track to the bracket means in another rotative position thereof, a housing having a recess, said track being disposed within said recess so that said housing overlies said discrete outside faces of the track, said housing having a pair of contacts, each contact being movable from an inoperative position within said housing to an operative position wherein each contact projects out of the housing and engages one of said conductors, and actuator means on said housing for moving said contacts between their operative and inoperative positions including a discrete actuator being attached to each contact, each actuator extending through a separate opening in said housing.

4,173,383
CONVERTER PLUG

Hop Lee, 2455 24th Ave., San Francisco, Calif. 94116

Filed Aug. 28, 1978, Ser. No. 937,470
Int. Cl.² H01R *3/06, 13/54*
U.S. Cl. 339—75 P **2 Claims**



1. A converter plug comprising:

(a) a main body with two recesses to receive the hook-shaped ends of two electrodes and a third recess to receive the hook-shaped end of a "ground" terminal;

(b) a pair of electrodes having hook-shaped ends and a

"ground" terminal having a hook-shaped end mounted in the three recesses;

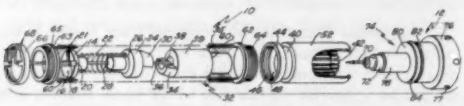
(c) a locking disc rockably mounted in said main body and covering the hook-shaped ends of the two electrodes and said "ground" terminal, said disc having two arcuate slots for receiving two prongs of a standard three prong plug, the disc also having an L-shaped slot for receiving the hook-shaped end of a third prong on the standard plug; and

(d) means for limiting the rotation of said disc with respect to said main body when the three slots in the disc are substantially out of registry with the hook-shaped ends of the two electrodes and "ground" terminal so that the three prongs of the standard plug can enter the three slots in the disc, the three hook-shaped ends of the three prong standard plug interlocking with the hook-shaped ends of the two electrodes and "ground" terminal when the standard plug is rotated with respect to the main body a predetermined distance for electrically connecting the standard plug to the main body of the converter plug.

4,173,384
FLEXIBLE CO-AXIAL CONNECTOR FOR CABLE IN-LINE ELECTRONICS

Raymond J. Phillips, Oakdale, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 23, 1978, Ser. No. 936,541
Int. Cl.[2] H01R *13/56*
U.S. Cl. 339—101 **5 Claims**



1. A flexible electrical connector system for inhibiting rotation comprising:

an insulated electrical connector having a split end and an electrical feedthrough with said split end adapted for connecting an electrical wire and the end opposite said split end suitable for receiving an external electrical conductor.

a spring cap having a split end suitable for abutting said insulated electrical connector split end so as to prevent relative rotation between said spring cap and said insulated electrical connector, said spring cap further having a first aperture adapted for passing through said electrical wire and a second aperture;

a flexible spring having one end inserted in said second aperture of said spring cap and adapted to have said electrical wire fed axially through said spring; and

a spring seat having a first aperture adapted to pass through said electrical wire and a second aperture having the other end of said flexible spring inserted therein.

4,173,385
WATERTIGHT CABLE CONNECTOR

John W. Fenn, Agincourt, and James R. Stokes, Bowmanville, both of Canada, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

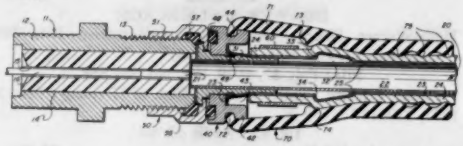
Filed Apr. 20, 1978, Ser. No. 898,276
Int. Cl.[2] H01R *13/34, 13/54*
U.S. Cl. 339—177 E **11 Claims**

1. An electrical connector assembly for terminating a coaxial cable including inner and outer conductors, an insulating member separating said conductors and an outer insulating layer covering the outer conductor, said connector assembly comprising:

a tubular conductive connector stem having a terminal end and a mating end and dimensioned to be mounted coaxially over the insulating member of the associated cable with said terminal end disposed between the insulating member and the outer conductor of the associated cable;

an annular collar diposed coaxially about said stem and having an annular retaining flange extending therefrom;

an outer sleeve having an annular lip at one end, said sleeve being mounted coaxially about the associated cable in sealing engagement therewith, and said lip resiliently engaging said annular retaining flange in sealing relationship;



a coupling nut rotatably carried by the mating end of said stem adjacent to said collar for coupling to a compatible connector component;

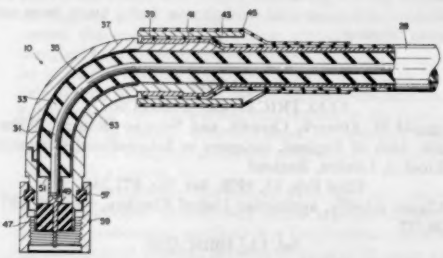
first annular seal means disposed between said coupling nut and said collar in sealing engagement with each; and

second annular seal means disposable between said coupling nut and the compatible connector component for sealing engagement with each.

4,173,386
COAXIAL ASSEMBLY

Roger S. Kauffman, Newark, and Donald L. Slothour, Wilmington, both of Del., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Mar. 13, 1978, Ser. No. 882,185
Int. Cl.[2] H01R *17/08*
U.S. Cl. 339—177 R **17 Claims**

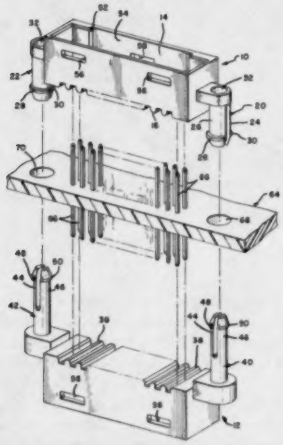


1. A connector for a coaxial cable for transmitting energy therethrough, the cable including a center conductor, an insulating medium, an outer cylindrical conductive shield and an outer jacket, the connector comprising: a tube having between its ends a bent portion said tube having a body and a cap, said body having a tubular cross-section at its mating end and said cap extending along at least a portion of said body, said body and said cap being separable for receiving therebetween a terminal portion of said center conductor, said insulating medium and said conductive shield; said body including electrically conductive means for forming an electrical connection with said conductive shield; and means for joining said cap to said body to form said tube after receipt of said terminal portion of said insulating medium and said conductive shield in said body.

4,173,387
SNAP-ON PIN HEADER

Dale R. Zell, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 28, 1978, Ser. No. 890,887
Int. Cl.[2] H01R *13/02*
U.S. Cl. 339—196 M 8 Claims



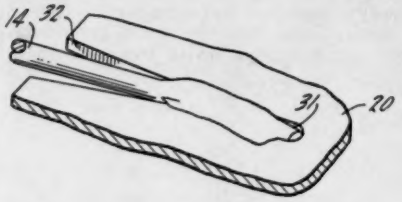
1. A snap-on header assembly comprising:
first and second header members each having a substantially rectangular profile defining a connector receiving cavity therein,
a base of each said cavity having a plurality of pin apertures therein aligned to receive a like plurality of pins therethrough, and
mounting leg means at each end of said members, the mounting leg means of said first connector member each being defined by a pair of spaced, integral, depending leg portions having an outer arcuate profile and an inner axial bore therebetween, and an outwardly directed arcuate shoulder on the free end of each of said leg portions; and
the mounting leg means of said second member each being defined by a pair of leg portions together having an outer cylindrical profile with a slot between said leg portions and outwardly directed shoulders on the free ends thereof, said leg means of said second member being dimensioned to be received through said bores of said first leg means with the shoulders engaging on the far side thereof.

4,173,388
CONNECTOR-CABLE WITH CRIMPED ELECTRICAL TERMINATIONS

Edward P. Brandeau, Willimantic, Conn., assignor to Akzona Incorporated, Asheville, N.C.

Continuation of Ser. No. 771,109, Feb. 23, 1977, abandoned. This application Jun. 26, 1978, Ser. No. 918,813
Int. Cl.[2] H01R *11/08*
U.S. Cl. 339—276 T 11 Claims

8. A fine wire termination plate member having a wire receiving slot with at least one open side extending along an axis, said open side defining an open throat substantially wider than the diameter of the wire to be terminated, said slot and said throat merging smoothly one into the other without substantial

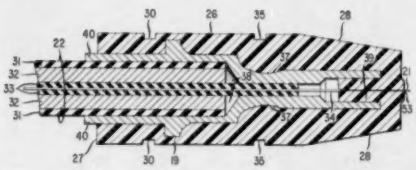


discontinuities, and said open side tapering from said throat to a width somewhat narrower than said wire diameter.

4,173,389
MOLDED OPTICAL FIBER CONNECTOR

Lyn Curtis, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 28, 1977, Ser. No. 837,398
Int. Cl.[2] G02B *5/14*; B29D *11/00*
U.S. Cl. 350—96.20 10 Claims



1. In a method of molding an optical fiber connector having a precisely formed mating surface, the steps comprising:
providing a molding die having a cavity with a predetermined shaped portion at one end for defining the mating surface and an axis, the other end of said cavity having a base wherein at least one orifice is located precisely in respect to said axis;
guiding an optical fiber through a first end of an elongated sleeve-like member to form a subassembly, said member being hollow throughout its length for passing said fiber;
positioning the first end of said member of said subassembly in said cavity so that said optical fiber is precisely located with respect to said axis while the other end of said member is in the proximity of the predetermined shaped portion of said cavity;
filling said cavity with a filler material so that said member accepts a flow of filler material including any gas pockets formed in the filler material to allow complete filling and conforming to the predetermined portion; and
solidifying said filler material to form a durable molded body around said optical fiber.

4,173,390
FIBER OPTIC T-COUPLER

Alfred Käch, Untersiggenthal, Switzerland, assignor to Patelhold Patentverwertungs- & Electro-Holding AG, Glarus, Switzerland

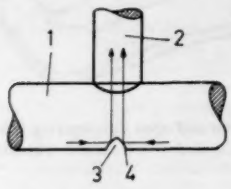
Filed Jan. 31, 1977, Ser. No. 763,826
Claims priority, application Switzerland, Mar. 16, 1976, 3231/76
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.16 20 Claims

1. A fiber-optics T-coupler comprising:
a solid transparent primary core provided for transmitting a

light therethrough, said primary core having a circular cross-section;

a branch core arranged at right angles to said primary core and forming said T-coupler;

said primary core having at least one recess formed therein, said recess provided with means defining a reflective surface for deflecting light passing through said primary



core and incident upon said reflective surface towards said branch core, said reflective surface having a curvature which cooperates with the curvature of said cross-section of said primary core to transmit light travelling in the longitudinal direction of said primary core onto said reflective surface and into said branch core in a manner similar to that of a plano-convex lens.

4,173,391

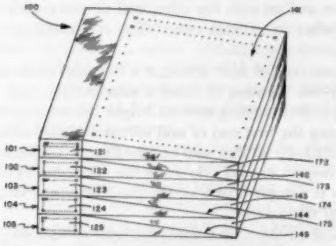
THREE DIMENSIONAL DISPLAY

Alexander Schure, Old Westbury, N.Y., and William E. Glenn, Ft. Lauderdale, Fla., assignors to New York Institute of Technology, Old Westbury, N.Y.

Filed Apr. 6, 1978, Ser. No. 893,958

Int. Cl.[2] G02B *5/16*

U.S. Cl. 350—96.25 **4 Claims**



1. Apparatus for receiving a plurality of two-dimensional images and for generating a three-dimensional display from said images, comprising:

a plurality of fiber optical image magnification units, each unit comprising an input surface defined by the input ends of a multiplicity of fiber optical strands which extend rearwardly and then sidewardly from the input surface and terminate at their output ends which define an output surface that is perpendicular to the input surface, said strands being supported in a transparent support medium;

said image magnification units being disposed one behind another with their output surfaces in substantially parallel relationship;

whereby upon application of said two-dimensional images to said input surfaces a three-dimensional image is generated by the output ends of said strands.

4,173,392

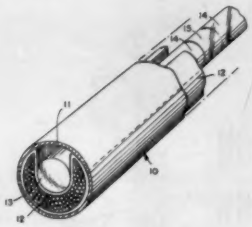
GLASS FIBER LIGHT GUIDE AND METHOD OF MAKING THE SAME

Michael H. Ekinaka, Irvine, and Richard B. MacAnally, Altadena, both of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Jul. 20, 1977, Ser. No. 817,152

Int. Cl.[2] G02B *5/17*

U.S. Cl. 350—96.26 **22 Claims**



1. A method for making a low-friction abrasion-resistant glass fiber light guide, comprising the steps of lining the cavity of a mold with a thin flexible film; introducing into the lined cavity a multiplicity of generally parallel glass fibers and a liquid potting material capable of passing into a hardened state; covering the exposed fibers and potting material with a second thin flexible film; introducing an insert element into the cavity to reform the assemblage of films, potting material, and fibers into a final predetermined cross-sectional configuration; then allowing said potting material to pass into its hardened state to embed and fix said fibers against relative movement, and withdrawing said insert element.

4,173,393

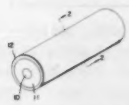
OPTICAL WAVEGUIDE WITH PROTECTIVE COATING

Robert D. Maurer, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Jun. 6, 1977, Ser. No. 803,771

Int. Cl.[2] G02B *5/14*; C03C *25/02*

U.S. Cl. 350—96.34 **11 Claims**



3. An optical waveguide comprising:

a transparent glass rod having a preselected index of refraction in the core thereof and a different index of refraction at the periphery thereof, and

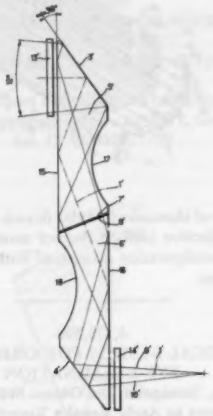
a coating of metallic glass around the periphery of said rod, said metallic glass being selected from the group consisting of at least one noble metal or transition metal and at least one metalloid.

4,173,394

PRISM COMBINATION PERISCOPE

Serge Clave, and Marcel Clave, both of 9 rue Olivier Metra, 7502 Paris, France

Filed Jul. 28, 1977, Ser. No. 819,676
Claims priority, application France, Sep. 20, 1976, 76 28172
Int. Cl.[2] G02B *13/08, 17/00*
U.S. Cl. 350—181 4 Claims



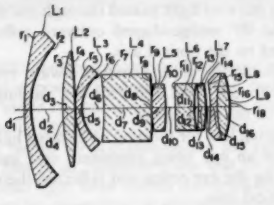
1. In a prismatic combination for periscopic viewing comprising two prismatic masses having two parallel respective light ray inlet and outlet faces and two parallel end faces inclined relative to said light ray inlet and outlet faces, respectively, the light ray entering the prismatic combination substantially normal to the inlet face being reflected from one end face after entering the combination and the light ray leaving the prismatic combination substantially normal to the outlet face being reflected from the other end face before leaving the combination, the inlet and the outlet directions of the light ray being substantially parallel, the improvement wherein the said end face on which the light ray is reflected after entering the combination and the said end face on which the light ray is reflected before leaving the combination are inclined at the same angle substantially less than 45° relative to said inlet and outlet faces, respectively, providing between the said two end faces a broken line optical path causing four reflections of light rays inside the combination, the first on one of said end faces, the second on said inlet face, the third on said outlet face and the fourth on said other end face.

4,173,395

WIDE ANGLE RETROFOCUS LENS SYSTEM

Koichi Kobayashi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 29, 1978, Ser. No. 891,360
Claims priority, application Japan, Apr. 2, 1977, 52/37995
Int. Cl.[2] G02B *9/64*
U.S. Cl. 350—214 5 Claims



1. A wide angle retrofocus lens system, comprising: nine lenses grouped in eight lens components in the following order from the object side to the image side, the first lens component being a negative meniscus lens having a convex surface facing the object, the second lens component being a positive double convex lens, the third lens component being a negative meniscus lens having a convex surface facing the object, the fourth lens component being either a positive or a negative meniscus lens having a concave surface facing the object, the fifth lens component being either a positive meniscus lens having a convex surface facing the object or a positive double convex lens, the sixth lens component being a negative lens, the seventh lens component being a positive meniscus lens having a concave surface facing the object, and the eighth lens component comprising a double concave lens on the object side and a double convex lens on the image side cemented together to form a positive lens, said lens system satisfying the following conditions:

$$0.8f < \sum_{i=1}^{7} d_i < 1.2f, \quad (1)$$

$$0.28 < f/|f_8| < 0.76, \text{ where } f_8 < 0, \quad (2)$$

$$0.34f < d_7 < 0.65f, \quad (3)$$

$$0.35f < \sum_{i=9}^{13} d_i < 0.52f, \text{ and} \quad (4)$$

$$0.13 < f/|r_4| < 0.25, \text{ where } r_4 < 0, \quad (5)$$

wherein:

f is the focal distance of the overall lens system,

f_i is the resultant focal distance of the first through the i-th lens surfaces,

r_i is the radius of curvature of the i-th refracting surface, and

d_i is the spacing between the i-th lens surface and the (i+1)-th lens surface, and wherein:

1 : 3.5, f_b = 134.71, f/f_8 = −0.689

	r	d	N/ν
L_1	r_1 = 207.46	d_1 = 5.36	n_1 = 1.51633/ν_1 = 64.1
	r_2 = 76.973	d_2 = 25.89	
L_2	r_3 = 168.06	d_3 = 9.82	n_2 = 1.58913/ν_2 = 61.1
	r_4 = 656.53	d_4 = 0.18	
L_3	r_5 = 57.78	d_5 = 5.71	n_3 = 1.51633/ν_3 = 64.1
	r_6 = 34.36	d_6 = 17.86	
L_4	r_7 = −234.66	d_7 = 38.39	n_4 = 1.51112/ν_4 = 60.5
	r_8 = −654.36	d_8 = 0.36	
L_5	r_9 = 119.40	d_9 = 10.71	n_5 = 1.83400/ν_5 = 37.3
	r_{10} = −302.61	d_{10} = 9.93	
L_6	r_{11} = −412.48	d_{11} = 14.71	n_6 = 1.74077/ν_6 = 27.8
	r_{12} = 93.34	d_{12} = 4.11	
L_7	r_{13} = −163.29	d_{13} = 5.07	n_7 = 1.80440/ν_7 = 39.6
	r_{14} = −74.33	d_{14} = 3.21	
L_8	r_{15} = −146.40	d_{15} = 5.36	n_8 = 1.64769/ν_8 = 33.8
L_9	r_{16} = 89.19	d_{16} = 10.71	n_9 = 1.69680/ν_9 = 55.5

-continued

1 : 3.5, f_b = 134.71, f/f_8 = −0.689		
r	d	N/ν
r_{17} = −71.99,		

wherein:

L_i is the i-th lens from the object side,

f_b is the back focal length,

N is the refractive index, and

ν is the Abbe number.

4,173,396

COPYING LENS

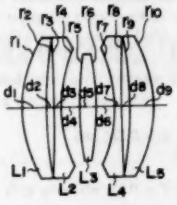
Minoru Yokota, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 18, 1978, Ser. No. 907,344

Claims priority, application Japan, May 31, 1977, 52/62744

Int. Cl.² G02B *9/60*

U.S. Cl. 350—216 **9 Claims**



1. In a lens system of five groups of five lens elements in which a front group of two lens elements and a back group of two lens elements are symmetrically arranged with a biconvex lens installed therebetween in the center of the lens system, a copying lens characterised in that each of the lens elements is constituted in sequence from the object by the first lens of a positive meniscus lens with its convex surface directed toward the object, the second lens of a biconcave lens, the third lens of a biconvex lens, the fourth lens of a biconcave lens, and the fifth lens of a positive meniscus lens with its convex surface being directed toward the image and in which the condition

$$0.2\ f<f_3<0.7\ f \quad (1)$$

where,

f: overall focal length,

f_3: focal length of the third lens,

and the condition

$$0.01\ f<d_4 \text{ and } d_6<0.09\ f \quad (2)$$

where,

$d_1, d_2, d_3, \ldots d_9$: thickness of the lenses and air gaps counted in sequence from the object,

are fulfilled.

4,173,397

SOLAR CONCENTRATOR

John G. Simpson, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

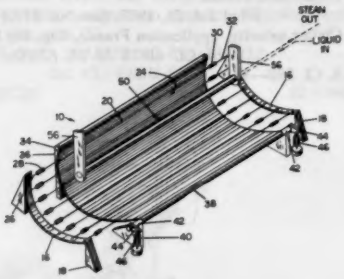
Filed Nov. 30, 1977, Ser. No. 856,465

Int. Cl.² G02B *5/10*

U.S. Cl. 350—295 **4 Claims**

1. In a solar concentrator, the improvement comprising:

A. a plurality of tensioned wires extended between a pair of arcuate base members for forming a frame of an elongated concave configuration, said wires being arranged in parallel with the axes thereof extended into intersecting relation with a common curve defined by said base members; and



B. a thin film of aluminized Mylar drawn taut over the frame with a reflective surface thereof assuming an elongated catenary configuration consistent with the configuration of the frame.

4,173,398

OPTICAL SYSTEM FOR OBJECTIVE EYE-EXAMINATION

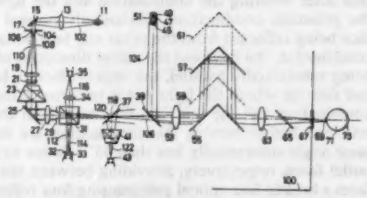
Ikuzo Okamoto, Tamagawa, and Osamu Shindo, Tokyo, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1978, Ser. No. 885,051

Claims priority, application Japan, Mar. 11, 1977, 52-26685

Int. Cl.² A61B *3/10*

U.S. Cl. 351—9 **5 Claims**



1. An optical apparatus for objective eye examination, comprising:

(a) means for generating two rotating pencil rays of infrared light each slightly displaced by different amounts from an optical axis,

(b) reflector means having a central opening therein angularly disposed on the optical axis,

(c) means for focusing said pencil rays in the vicinity of said reflector means opening,

(d) a dichroic mirror disposed on the optical axis beyond the reflector means for reflecting visible light and passing infrared light,

(e) a collimator lens disposed on the optical axis for paralleling any infrared light passed through the dichroic mirror,

(f) a fixed 90° wedge-shaped outward reflector angularly disposed on the optical axis,

(g) a movable 90° wedge-shaped inward reflector cooperable with the fixed reflector for varying the effective length of the optical axis,

(h) a focusing lens for forming an infrared light image on the pupil of an eye being examined, said image being projected on the eye retina and reflected thereby back along the optical axis,

(i) an image rotator disposed to receive returned infrared light reflected thereon by said reflector means,

(j) a quadrant photodetector disposed to receive infrared light from said image rotator, and

(k) means for generating differential output signals from said photodetector outputs, whereby said movable reflector may be moved until said differential output signals reach an optimum value, the necessary degree of such movement being indicative of the refractive power of the eye.

4,173,399

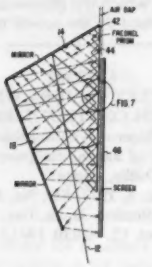
COMPACT OPTICAL VIEWER FOR MICROFICHE OR CASSETTE

George J. Yevick, Leonia, N.J., assignor to Izon Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 717,858, Sep. 13, 1976, abandoned. This application Nov. 22, 1977, Ser. No. 854,001

Int. Cl.[2] G03B *21/28*

U.S. Cl. 353—78 **19 Claims**



1. An optical projector of the type for projecting a cone of light from an illuminated microimage, including, a plurality of reflecting surfaces for intercepting and folding a cone of light, one of said reflecting surfaces reflecting light incident thereon at angles greater than a critical angle but which transmits light therethrough for any light incident thereon at angles less than the critical angle, characterized by, the one said reflecting surface defined by a prism sheet, and a viewing screen parallel and adjacent to but spaced from the prism sheet.

4,173,400

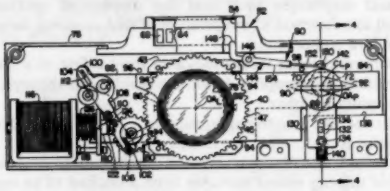
PHOTOGRAPHIC CAMERA APPARATUS

Faramarz Faramarzpour, Sudbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 2, 1978, Ser. No. 874,387

Int. Cl.[2] G03B *15/02, 7/00*

U.S. Cl. 354—27 **11 Claims**



1. Photographic camera apparatus of the type which has a distinct ambient exposure mode of operation and a distinct flash exposure mode of operation in which an artificial light source is utilized to illuminate a scene to be photographed and which includes means for accommodating the positioning of photosensitive film in an exposure plane and an optical path along which scene light from within the apparatus's angular field of view may be transmitted to expose film located in the exposure plane, said apparatus further comprising:

light detecting means, including at least one photodetector having a photosensitive surface of predetermined size, for providing, at least during exposure, an electrical output signal having a characteristic which varies as a function of the intensity of scene light incident on said photodetector's photosensitive surface;

optical means structured to cooperate with said photodetector's photosensitive surface to define a predetermined angular light acceptance zone from which light from a scene is received by said apparatus and directed onto said photodetector's photosensitive surface;

means for moving at least part of said optical means between a first position, corresponding to said apparatus's ambient exposure mode of operation, in which said angular light acceptance zone of said apparatus is aimed in a first predetermined angular direction at a scene and a second position, corresponding to said apparatus's flash exposure mode of operation, in which said angular light acceptance zone of said apparatus is aimed in a second predetermined angular direction at a scene, said moving means operating in response to converting said apparatus from its said ambient exposure mode of operation into its said flash exposure mode of operation to displace said optical means part from its said first position to its said second position, said moving means and said optical means being configured and arranged with respect to one another and said photodetector's photosensitive surface so that said angular light acceptance zone is substantially the same size when aimed in either its first or second predetermined angular direction;

a blade mechanism;

means for mounting said blade mechanism for displacement between at least one blocking arrangement in which said blade mechanism precludes scene light from being transmitted along the optical path of said apparatus and an unblocking arrangement in which said blade mechanism defines at least one aperture value structured to transmit scene light along the optical path of said apparatus to expose photosensitive film located in the film plane;

drive means actuable to displace said blade mechanism between its blocking and unblocking arrangements; and

control means energizable at least in part by a source of electrical energy for monitoring said output signal of said light detecting means, for actuating said drive means to displace said blade mechanism from its said blocking arrangement toward its said unblocking arrangement thereby initiating an exposure interval during which scene light is transmitted along the optical path of said apparatus, and for integrating said output signal of said light detecting means beginning substantially at the commencement of said exposure interval and actuating said drive means when the time integral of said output signal reaches a predetermined value to displace said blade mechanism into its said blocking arrangement thereby terminating said exposure interval.

4,173,401

APPARATUS FOR DISPLAYING ALPHANUMERIC INFORMATION CODED ON A FILM CARTRIDGE

Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 15, 1978, Ser. No. 905,689

Int. Cl.[2] G03B *7/00, 13/02, 17/26*

U.S. Cl. 354—21 **7 Claims**

1. In a camera having means for receiving a film cartridge, the cartridge having code indicia representing a plurality of characteristics of film in the cartridge, the improvement comprising:

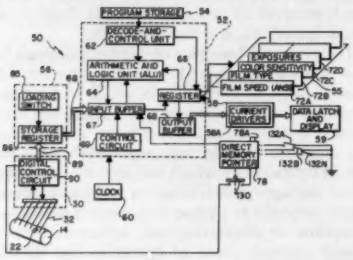
(a) means for sensing said indicia;

(b) means controlled by said sensing means for producing a first output signal representing said characteristics;

(c) characteristic selector means for providing a second output signal representing a film characteristic selected to be displayed;

(d) randomly accessible memory means having addressable data storage locations for storing data representing respective characteristics of a variety of photographic films;

(e) electronic computer means, coupled to said signal producing means and said characteristic selector means, for receiving said first output signal and said second output signal, and, in response thereto, for (1) randomly accessing



said addressable data storage locations to retrieve data corresponding to a characteristic of the film in the cartridge that was selected, and (2) generating a third output signal corresponding to said retrieved data; and

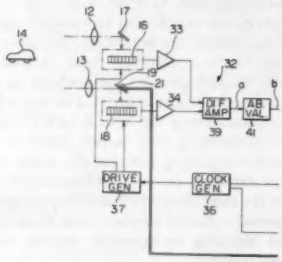
(f) display means coupled to said computer means for receiving said third output signal and, in response thereto, for producing an alphanumeric display identifying said selected characteristic.

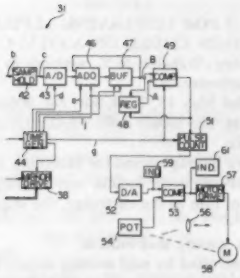
4,173,402

OPTOELECTRONIC SENSING APPARATUS

Masanori Horike; Isamu Shibata, and Ikuo Maeda, all of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 6, 1978, Ser. No. 883,838
Claims priority, application Japan, Mar. 10, 1977, 52-26386
Int. Cl.[2] G03B *13/20;* G01C *3/08*
U.S. Cl. 354—25 **10 Claims**





1. An optoelectronic sensing apparatus comprising:

a photosensor array including a plurality of photosensor elements for producing respective electrical signals having magnitudes corresponding to incident light intensity;

optical converging means for focussing a progressively changing light image onto the photosensor array;

reference signal means for producing a plurality of electrical reference signals equal in number to the signals;

strobe means for sequentially strobing the photosensor elements a predetermined number of times, each photosensor element producing the respective electrical signal when strobed;

subtractor means for comparing respective electrical signals and reference signals and producing electrical difference signals corresponding to differences therebetween;

minimum value sensor means for sensing a minimum absolute value of the difference signals; and

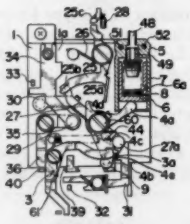
counter means for progressively counting a number of times the photosensor elements are sequentially strobed by the strobe means and producing an electrical count signal having a magnitude corresponding to a count of the counter means at which the minimum value of the difference signals is sensed by the sensor means.

4,173,403

SINGLE LENS REFLEX CAMERA WITH AUTOMATIC DIAPHRAGM CONTROL MECHANISM

Hiroshi Ueda, Nara; Shigeru Oyokota, Sakai, and Hideo Kajita, Chihayaakasaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 8, 1977, Ser. No. 858,790
Claims priority, application Japan, Dec. 9, 1979, 51-147133
Int. Cl.[2] G03B *19/12*
U.S. Cl. 354—152 **7 Claims**



1. In a single lens reflex camera having a reflex mirror and adapted for use with an interchangeable lens detachably mounted on the camera body and having diaphragm and diaphragm control mechanisms including a coupling member adapted to be coupled with a camera mechanism provided in the camera body, said coupling member being interconnected with said diaphragm such that the diaphragm aperture is changed as a function of the position of said coupling member, said camera comprising:

diaphragm driving means movable from a first to a second position for stopping-down the diaphragm through said coupling member;

means for stopping the movement of said diaphragm driving means to determine the diaphragm aperture;

first delay means for delaying said diaphragm driving means;

mirror driving means movable from a cocked to an operating position for driving said reflex mirror;

restraining means for restraining said mirror driving means at said cocked position;

operating means movable from a retaining position for retaining said diaphragm driving means at said first position to an operating position for releasing said restraint on said mirror driving means, said diaphragm driving means being interlocked with said operating means to follow the latter when it moves from said retaining to said operating position; and

means for acting on said operating means to force the latter

to release the restraint on said mirror driving means, said means for acting including second delay means for causing release of the restraint later than the determination of the diaphragm aperture.

4,173,404

SHUTTER DIAL DEVICE FOR CAMERA

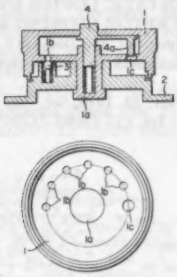
Shigeo Akasaka, Kodaira, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Nov. 15, 1977, Ser. No. 851,678

Claims priority, application Japan, Nov. 30, 1976, 51-159240[U]

Int. Cl.[2] G03B *17/18;* G01D *13/00*

U.S. Cl. 354—289 **2 Claims**



1. A shutter dial device for a camera having a shutter dial having a plurality of apertures for manual setting which are equal in diameter and formed on a circle centered at the rotary shaft of the shutter dial and a steel ball biased so as to be urged into each of said apertures, said apertures and said steel ball together constituting a click stop mechanism for manually setting the shutter speed, the improvement comprising:

an aperture for automatic setting formed on said circle of said shutter dial and having a diameter equal to or larger than the diameter of said steel ball; and

a release member provided on said shutter dial for stopping said steel ball in a position where half or more of said steel ball drops into said aperture for automatic setting and for forcing back said steel ball out of said aperture for automatic setting by manual operation.

4,173,405

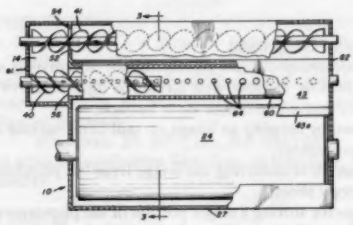
DEVELOPER DISTRIBUTION APPARATUS

John P. Swapceinski, Bergen; Thomas K. Hilbert, Spencerport, and James A. McGlen, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1977, Ser. No. 847,382

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 DD **4 Claims**



3. In electrographic development apparatus including a development station where toner particles are removed during development, from developer having toner and carrier particles and at least one rotating auger for mixing toner and carrier particles and for transporting developer to said development station, the improvement comprising:

(a) a member disposed in said development station adjacent to said auger for supporting the developer as it is transported by said auger and having at least three openings of different sizes arranged so that developer transported by said rotating auger flows through said openings; and

(b) surface defining means disposed in said development station under said openings, said surface extending laterally and sloping downwardly so that developer flowing through said openings engages said surface, spreads laterally on said surface, moves downwardly under the influence of gravity, and is evenly distributed.

4,173,406

ELECTRICAL CHARGE REMOVING ARRANGEMENT FOR REMOVING CHARGE FROM NON-IMAGE BEARING PORTIONS OF PHOTO-SENSITIVE MEDIUM

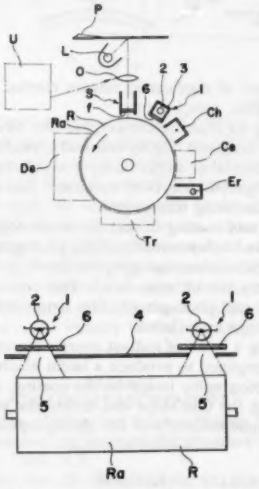
Kenjiro Oyama, Toyokawa, and Koji Imaizumi, Aichi, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 31, 1978, Ser. No. 892,862

Claims priority, application Japan, Apr. 22, 1977, 52-46965

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 R **12 Claims**



7. In a photocopying machine having a photosensitive medium, corona charging means for charging said photosensitive medium, exposure means including a light source for illumination of an original document to be copied and an optical system for projecting image light from the original document thus illuminated onto said photosensitive medium subsequent to charging thereof by said corona charging means in order to effect production of an electrostatic latent image of said original document on said photosensitive medium, a charge erasing arrangement directed toward said photosensitive medium and actuable to effect erasing of electrical charge from portions of said photosensitive medium which are unnecessary for production of the electrostatic latent image, said charge erasing arrangement comprising;

housing means;

charge erasing lamp means accommodated in said housing means, and filter means for wavelength range correction disposed between said charge erasing lamp means and said photosensitive medium for passing only light from said

charge erasing lamp means in a range of wavelengths approximately equal to the range of wavelengths of said image light from said exposure means.

4,173,407

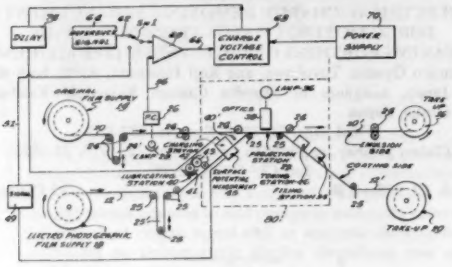
ELECTROPHOTOGRAPHIC CONTACT DUPLICATING APPARATUS AND METHOD

Manfred R. Kuehnle, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Continuation of Ser. No. 641,073, Dec. 15, 1975, abandoned, which is a continuation-in-part of Ser. No. 397,310, Sep. 14, 1973, Pat. No. 3,951,541. This application Oct. 14, 1977, Ser. No. 842,361

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—12 **39 Claims**



10. A method of duplicating images carried on a strip of photographic film, comprising,

A. providing an electrophotographic film having a coating of wholly inorganic, highly oriented crystalline photoconductive material on an ohmic layer which is in turn carried on a transparent polyester substrate, said electrophotographic film being transparent,

B. charging said coating of said electrophotographic film in darkness and independently of the photographic film,

C. moving said electrophotographic film strip after charging immediately into intimate face to face contacting engagement with said photographic film strip while maintaining the two strips in darkness,

D. projecting a beam of radiant energy through both strips while so engaged to produce a latent electrostatic image of the photographic image on the coating, and

E. separating the film strips and toning the latent image in darkness independently of the photographic film.

4,173,408

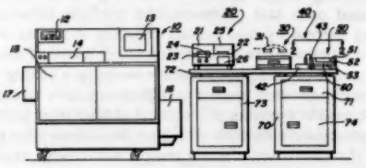
DEMAND PUBLISHING ROYALTY ACCOUNTING SYSTEM FOR AN ELECTROSTATIC COPIER

Donald E. Stewart, Arcadia, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 29, 1977, Ser. No. 828,576

Int. Cl.[2] G03G *15/00*; G06F *7/38*; G06G *7/00*

U.S. Cl. 355—14 R **19 Claims**



1. A transaction accounting system for automated copyright royalty accounting of copies made from copyrighted original documents, each document to be copied having a mark which identifies the copyright owner, said system comprising:

duplicating means on which the original document is positioned,

a machine reader for reading said mark on said original document,

transaction information input means for entering the number of copies to be produced, and

a control system for receiving the output of said machine reader, for receiving the output of said transaction information input means, for controlling said duplicating means to produce the entered number of copies, and for outputting transaction data which specifies the copyright owner and the number of copies produced.

4,173,409

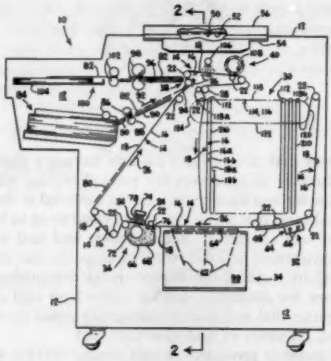
ELECTROSTATIC COPIER INCLUDING PHOTORECEPTOR STORING APPARATUS

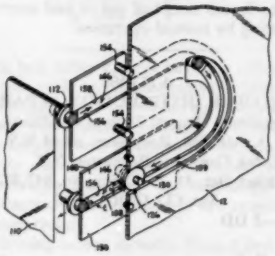
James E. Genthe, Newtown, and Douglas I. Morrison, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Nov. 22, 1976, Ser. No. 743,781

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—16 **8 Claims**





1. A copier comprising:

(a) a photoreceptor, said photoreceptor comprising a movable flexible endless web having a light-sensitive outer surface and a non-image inner surface;

(b) means for forming an image on said outer surface of said photoreceptor;

(c) means for transferring the image from the photoreceptor to a copy sheet;

(d) means for storing a major portion of the photoreceptor in the form of a plurality of wavy U-shaped loops, said storing means including means for spacing the respective photoreceptor loops apart from next adjacent loops said spacing means including a plurality of pairs of spaced apart means for edgewise supporting the inner surface of said photoreceptor from the top of said loops in order to

form said loops with the bottom of said loops being unsupported;

(e) means for intermittently moving said loops laterally in unison a predetermined distance through said storing means without moving said photoreceptor longitudinally through said storing means; and

(f) said means for spacing said photoreceptor loops including a plurality of movable carriers adapted to support said photoreceptor loops, each of said photoreceptor loops supported by at least one of said carriers, and said means for intermittently moving said loops including means for intermittently actuating said carriers.

4,173,410
METHOD OF DUPLEX COPYING

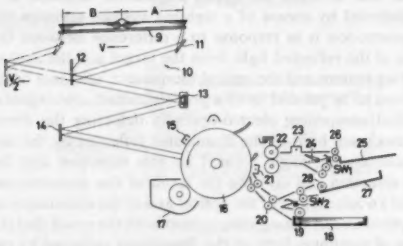
Yasuhiro Tabata, Kawasaki; Toyokazu Satomi, Yokohama; Yutaka Koizumi, Kawasaki; Isao Nakamura, Tokyo, and Tamaki Kaneko, Fujisawa, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Jan. 26, 1978, Ser. No. 872,383

Claims priority, application Japan, Jan. 31, 1977, 52/9480

Int. Cl.[2] G03B *27/32, 15/00;* **B65H** *29/68*

U.S. Cl. 355—24 **8 Claims**



7. A duplex copying apparatus in which a toner image is transferred to a first and second side of a transfer sheet comprising: primary sheet feed means to feed the transfer sheet to a photoconductive drum and transfer a toner image on one side thereof, second sheet feed means to which the transfer sheet is then fed and from which the transfer sheet is fed to said photoconductive drum where another toner image is transferred to a second side of the transfer sheet and the transfer sheet is discharged to a sheet outlet tray, said second sheet feed means comprising, in combination, a base for stacking transfer sheets thereon; a front plate and a side reference plate adjacent said base and fixedly disposed normal to each other; and at least one movable plate disposed parallel to one of said front plate and said side reference plate and operable to bring transfer sheets into contact with both said front plate and said side reference plate so that the transfer sheets, in a stack, are lined up evenly.

4,173,411
EXPOSURE SYSTEM FOR COPYING MACHINES

Hans A. Massengeil; Otto Stemme, both of Munich; Rudolf Eppe, Taufkirchen; Josef Pfeifer, Unterhaching; Georg Könige, and Anton Schätz, both of Munich, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

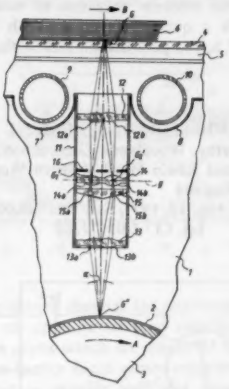
Filed Nov. 25, 1977, Ser. No. 854,750

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1976, 2654319

Int. Cl.[2] G03B *27/48, 27/50*

U.S. Cl. 355—50 **9 Claims**

1. In an exposure arrangement for copying machines, the exposure arrangement being of the type including an optical projection system and means for effecting relative movement between the projection system and an original to be copied in a predetermined direction to project onto a recording medium images of successive transverse strip-shaped sections of the original, the projection system comprising a plurality of lens-row systems, each lens-row system comprising a first row of lens elements operative for receiving light from a strip-shaped section of the original and projecting the received light into an intermediate image plane, each lens-row system comprising a second row of lens elements cooperating with the elements of the respective first row and operative for receiving light from the intermediate plane and projecting the received light onto the recording medium, the lens-row systems being spaced apart in a direction transverse to the direction of elongation of



the individual rows of lenses, the light passing through each lens-row system including a plurality of central rays, each central ray being a ray passing through the optical center of one lens element of the first row of the lens-row system and also passing through the optical center of the corresponding lens element of the second row of the lens-row system,

the improvement comprising the provision of optical deflecting means located in the light path of the projection system and operative for causing the central rays of the lens-row systems to converge both in the vicinity of the original and in the vicinity of the recording medium.

4,173,412
STRAIN MEASUREMENT

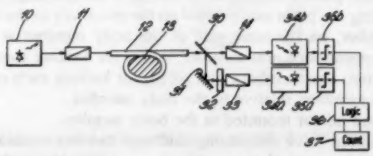
Melvin M. Ramsay, Harlow, and Stephen Wright, London, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Jun. 29, 1977, Ser. No. 811,008

Claims priority, application United Kingdom, Jul. 1, 1976, 27438/76

Int. Cl.[2] G01B *11/16;* **G01J** *4/04*

U.S. Cl. 356—33 **10 Claims**



1. A method of measuring the magnitude of strain in at least one optical fiber of circular symmetry comprising the steps of:

straining the fiber over a portion of its length in a direction perpendicular to the fiber axis;

propagating polarized light through the fiber while under strain;

monitoring the polarized light propagating through the fiber to determine the strain-induced difference in phase veloc-

ity of two orthogonal fundamental modes of the propagated light; wherein the strain is applied to one single fiber and wherein the strain induced phase velocity difference of the two orthogonal fundamental modes is measured by polarized light having components in and perpendicular to the strain direction into one end of the fiber and exiting the light from another end of the fiber; and

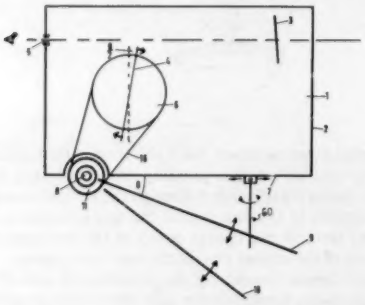
splitting the light emerging from the fiber into two components each of said components passing to an associated photodetector through an associated linear polarization analyzer having a polarization axis aligned at 45° to the strain direction wherein only one of said analyzers is prefaced with a quarter-waveplate with its optic axis aligned at 45° to the polarization axis of the analyzer.

4,173,413

NAVIGATION INSTRUMENT

Gordon K. Clatworthy, Woodlands, Glanconway, Colwyn Bay, Clwyd, Wales, and Edwin Ward, 4 Birch Way, Harpenden, Hertfordshire, England

Filed Aug. 15, 1977, Ser. No. 824,609
Int. Cl.[2] G01C *1/02*
U.S. Cl. 356—145 **6 Claims**



1. An instrument for taking bearings between objects and plotting them, comprising:

a body member having a straight edge,

a first mirror mounted in the body member,

eyepiece means for viewing a first object through the body member over said first mirror, said first mirror being mounted at an angle to a line along which said first object is viewed,

an arm member, having a straight edge, pivoted to the body member at a pivot axis, wherein said respective straight edges of said body member and arm member intersect at said pivot axis, and wherein said straight edges extend substantially the entire length of said instrument,

a further, passive arm member having a straight edge intersecting the pivot axis pivoted on the pivot axis to the body member, on the same side of the body member as said first-mentioned arm member, means for locking together the two arm members, and means for locking each of the arm members relative to the body member,

a second mirror mounted in the body member,

a reduction drive connecting said arm member to said second mirror, so that as said arm member is turned, said second mirror is constrained to rotate in the same direction and through half the angle that said arm member turns through,

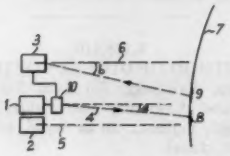
the angle of said first mirror to said line being such that light rays reflected from the second mirror to the first mirror are reflected from the first mirror to the eyepiece means along said line, to achieve a condition of coincident images.

4,173,414

METHOD AND APPARATUS FOR CORRECTING THE AIMING OF AN OPTICAL ILLUMINATOR ON A TARGET

Jean-Marie Vauchy, St-Cloud, and Dominique de Ponteves, Flers, both of France, assignors to Societe de Fabrication d'Instruments de Mesure (S.F.I.M.), Massy, France

Filed Mar. 17, 1977, Ser. No. 778,499
Claims priority, application France, Oct. 18, 1976, 76 31252
Int. Cl.[2] G01B *11/26;* **F41G** *7/00*
U.S. Cl. 356—152 **15 Claims**



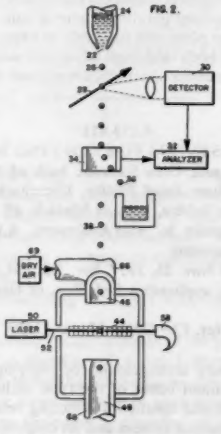
1. A method for correcting the aiming of target aiming apparatus that includes an optical illuminator directed at a target observed by means of a sighting system, wherein the aiming correction is in response to a difference between the direction of the reflected light from the target and the axes of the sighting system and the optical illuminator, said axes being harmonized to be parallel or of a predetermined convergence, the method comprising electro-optically detecting the direction of maximum light of the illuminator reflected by the target, measuring the angle formed by this direction and the sighting direction and utilizing the result of this measurement to control an orientation of the optical axis of the illuminator or of the optical axis of the sighting system with the result that the direction of maximum light of the illuminator reflected by the target coincides with the optical axis of the sighting system.

4,173,415

APPARATUS AND PROCESS FOR RAPIDLY CHARACTERIZING AND DIFFERENTIATING LARGE ORGANIC CELLS

Philip J. Wyatt, Santa Barbara, Calif., assignor to Science Spectrum, Inc., Santa Barbara, Calif.

Filed Aug. 20, 1976, Ser. No. 716,278
Int. Cl.[2] G01N *15/02*
U.S. Cl. 356—336 **33 Claims**



1. A process for analyzing the cells of a size substantially

larger than a wavelength of visible light, the cells being in a liquid suspension, the process comprising the steps of:

Aerosolizing the suspension of cells to produce a series of droplets, some of which contain a cell;

Separating those droplets containing a cell from the other droplets which do not contain cells;

Illuminating in sequence the separated cells with a beam of monochromatic radiation of a wavelength which, when compared to the size of the cell, is in the resonance region;

Detecting radiation intensities of a given polarization scattered by each illuminated cell to obtain a differential scattering pattern characterizing the size, shape, and dielectric properties of each cell; and

Recording the detected patterns to characterize the illuminated cells.

4,173,416
SCANNING HEADS FOR TRANSPARENCIES

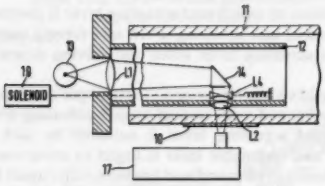
Peter C. Pugsley, Pinner, and Michael J. Perriman, Harpenden, both of England, assignors to Crosfield Electronics Limited, London, England

Filed Jun. 22, 1977, Ser. No. 808,799

Claims priority, application United Kingdom, Jun. 26, 1976, 26698/76

Int. Cl.[2] G01N *21/06*

U.S. Cl. 356—432 **5 Claims**



1. Apparatus for image scanning and analysis comprising a transparency support and a photoelectric image analyzer mounted for relative movement either for continuous scanning of an image bearing transparency placed on the support or discontinuously under the control of an operator, the image analyzer comprising a light source, means for directing light from the source to a spot on the transparency, and photoelectric means for receiving light from the source which is passed through the transparency and generating a signal corresponding thereto, wherein the improvement comprises means, for use in a parameter-setting operation preliminary to scanning, comprising:

means under the control of an operator for relatively moving the image analyzer and the transparency support to select for analysis a spot on the transparency; and

measuring means including:

means for illuminating the spot on the transparency selected by the operator with a focused light beam for a predetermined period insufficient for the focused light beam to cause bleaching of the transparency; and

sampling means operable to sample and hold the value of the signal derived from the photoelectric means during said predetermined period of illumination of said spot with a focused beam.

4,173,417
EXTRUSION APPARATUS AND METHOD

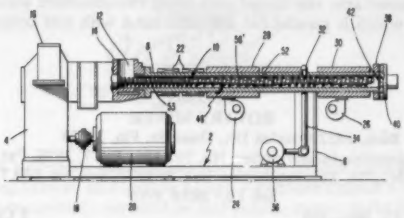
George A. Kruder, Marion, Ohio, assignor to HPM Corporation, Mount Gilead, Ohio

Continuation-in-part of Ser. No. 788,028, Apr. 15, 1977, abandoned. This application Jun. 20, 1978, Ser. No. 917,204

Int. Cl.[2] B29B *1/06*

U.S. Cl. 366—89 **20 Claims**

1. In plasticating apparatus of the type in which a rotating screw is disposed within and cooperates with the inner wall of a barrel provided with inlet and outlet openings and wherein particles of synthetic resinous material are introduced through said inlet opening and into a helical passage formed by conveying flight means of said screw, plasticated by said rotating screw and advanced toward said outlet opening, the improvement comprising a screw having a section for assuring complete melting and mixing of said resinous material, said screw section including outwardly extending barrier flight means disposed intermediate said conveying flight means to divide said passage into channels extending side by side helically along said screw section, each of said channels having a depth which varies cyclically through at least four cycles along the



helical length of such channel, the minimum depth portions of the channels on opposite sides of said barrier flight means defining wave crests which are displaced helically from each other, and the barrier flight means adjacent each wave crest being undercut to provide sufficient clearance between its outermost surface and the inner barrel wall to permit the flow thereover of molten resinous material from the channel containing an area of decreasing depth to an adjacent area of the other channel, the outer width of said barrier flight means being shorter than that of said conveying flight means, and being less than eight percent of the screw pitch, so that the shear energy imparted to molten material flowing over said barrier flight means is low.

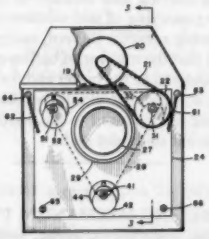
4,173,418
APPARATUS FOR MIXING LIQUIDS

William D. Vork, Edina, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed Jun. 29, 1978, Ser. No. 920,457

Int. Cl.[2] B01F *11/00*

U.S. Cl. 366—128 **19 Claims**



1. An apparatus for mixing paint and the like in closed containers, comprising

(a) a box-like frame assembly

(b) a mounting plate vertically suspended from said frame assembly, said mounting plate having an enlarged hole therethrough and three bearing assemblies approximately equally spaced about said enlarged hole;

(c) a crankshaft passing through each of said bearing assemblies and through an aligned opening in said mounting plate;

(d) a drive pulley attached at one end of one of said crankshafts;

(e) rotary drive means attached to said mounting plate and coupled to said drive pulley in driving engagement; and

(f) a shaker plate having respective bearing assemblies coupled to each of said crankshafts said shaker plate having rigidly attached thereto a cylindrical housing, said housing passing through said enlarged hole in said mounting plate.

15. A method of mixing liquids such as paint in a closed cylindrical container, comprising the steps of rotating said container about its own axis and simultaneously moving said container over a closed path in a plane which is normal to said container axis, said closed path being circumscribed about an axis which is parallel but not coincident with said container axis.

4,173,419

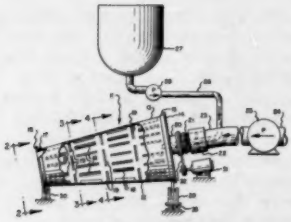
ROTARY MIXER

Arie Blok, 1422 Overlea Dr., Dunedin, Fla. 33528

Continuation-in-part of Ser. No. 703,126, Jul. 7, 1976, Pat. No. 4,062,776. This application Dec. 8, 1977, Ser. No. 858,776

Int. Cl.[2] B01F *9/06*

U.S. Cl. 366—228 **3 Claims**



1. A mixer comprising a frusto-conical drum having a large inlet end and a restricted open outlet end, means for supplying a mixture of sludge and a flocculating polymer to said inlet end, support means supporting said drum for rotation about a generally horizontal axis, and drive means for rotating said drum on said support means, said drum including an imperforate wall, a series of baffles mounted on said wall internally of said drum in circumferentially spaced relation to each other and extending longitudinally and generally radially inwardly of said drum for stirring said mixture of sludge and polymer while minimizing carrying of said mixture upwardly to the top of said drum during rotation thereof, said mixer being further characterized in that the number of baffles of each series diminishes from the inlet end to the outlet end for providing adjacent said outlet end a relatively gentle handling of flocs formed from said mixture as compared to the mixing action caused by said baffles adjacent said inlet end.

4,173,420

PAPER FEEDING MECHANISM IN A PRINTER

Katsuhiko Okabe, Tokorozawa, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Mar. 31, 1978, Ser. No. 892,269

Claims priority, application Japan, Apr. 5, 1977, 52-38691; Apr. 18, 1977, 52-48739[U]

Int. Cl.[2] B41J *15/22*

U.S. Cl. 400—618 **3 Claims**

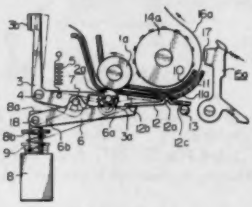
1. A paper feeding mechanism in a printer having a continuously rotating feeding roller which is capable of feeding recording paper, a pressure roller cooperating with said feeding roller for feeding said recording paper sandwiched between said feeding roller and said pressure roller along a paper guide means, and a printing ring cooperating with a printing hammer for printing upon recording paper fed therebetween, said paper feeding mechanism comprising:

a swingable lever supporting at least one of said feeding roller and said pressure roller;

means for resiliently urging said one of said feeding roller and said pressure roller into disengageable engagement with the other but with said recording paper sandwiched therebetween and fed by said continuously rotating paper feeding roller;

an actuating lever pivoted to said swingable lever intermediate their ends;

a paper arresting means contacting said actuating lever at one end so as to cooperate with the operation thereof and



adapted to be actuable so as to releasably contact and arrest said recording paper; and

driving means to which said actuating lever is pivoted at the other end of said actuating lever, said driving means driving said actuating lever when said driving means is actuated;

wherein said swingable lever and said paper arresting means are so arranged with respect to said actuating lever that, when said actuating lever is actuated by said driving means, said swingable lever is urged to move one of said paper feeding roller and said pressure roller apart from the other, so as to inactivate the feeding of said paper by said paper feeding roller while said paper arresting means is actuated by said actuating lever to arrest said paper.

4,173,421

SHIELD APPARATUS FOR USE IN TUNNELLING OR MINING

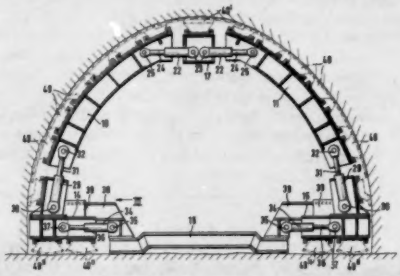
Karl Harhoff, and Heinz Hüsemann, both of Werne, Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany

Filed Oct. 7, 1977, Ser. No. 840,447

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1976, 2646552

Int. Cl.[2] E21D *19/00*

U.S. Cl. 405—291 **5 Claims**



1. In a shield apparatus for driving tunnels or the like comprising two axially spaced apart support frames each of generally arch-shaped configuration, drive members supported on the outer sides of the frames, the drive members extending in the axial direction, and means for shifting one frame relative to

the next in the axial direction, the improvement comprising support frames each assembled from:

two transversely spaced apart floor components,

a ridge component,

two transversely spaced apart outwardly arcuate side components, each side component having upper and lower ends, the upper end thereof being adjacent a respective side of the ridge component, the lower end thereof being disposed above a respective one of the floor components,

a pair of first telescopic guide means, each comprising a first member rigid with one of the floor components and a second member pivoted to the associated side component about an axis extending axially of the apparatus,

a pair of second telescopic guide means, each comprising a member rigid with a respective side component and a member pivoted to the ridge component about an axis extending axially of the apparatus,

a pair of first hydraulic ram means, each acting between the ridge means and a respective side component, and

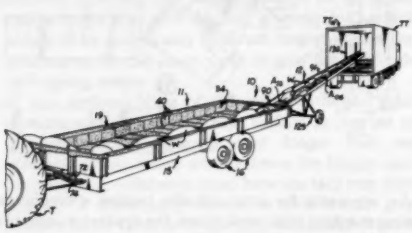
said arcuate side components being supported solely at said upper and lower ends.

4,173,422

PRODUCE HANDLING SYSTEM

Benjamin R. Baker, Rte. 1, Norman Park, Ga. 31771, and Mickey C. Baker, Rte. 2, Moultrie, Ga. 31768

Filed Feb. 13, 1978, Ser. No. 876,887
Int. Cl.[2] B65G *67/24*
U.S. Cl. 414—390 **7 Claims**



1. In a produce handling system for relative heavy fragile produce such as watermelons, cantaloupes and the like, a trailer comprising:

a trailer frame including ground engaging wheels;

a bed carried by said frame, defining a produce receiving bin therein, and defining a conveyor channel along the length of the bottom of said bin; and,

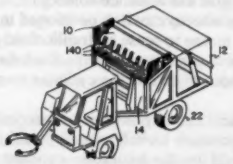
a trailer unloading conveyor mounted in and extending along said conveyor channel, said conveyor including a support pan extending along the length of said conveyor channel and having a generally V-shaped cross-sectional configuration transversely of said conveyor channel so that said support pan extends across the width of said conveyor channel, a trailer idler unit at one end of said conveyor channel, a trailer drive unit at the opposite end of said conveyor channel, and an endless conveyor belt extending over said support pan, and around said idler unit and said drive unit so that said support pan supports said conveyor belt along opposite edges thereof when said conveyor belt is unloaded with said conveyor belt forming a natural catenary shape not in contact with said support pan between the opposed edges of said conveyor belt to cushion the produce being placed on said conveyor belt as said conveyor belt moves along said conveyor channel so that the support channel supports those portions of said conveyor belt between said opposed edges thereof distorted out of the catenary shape by the weight of the produce thereon to prevent damage to the produce as said conveyor belt supports and moves the produce from said produce receiving bin.

4,173,423

TRASH BIN LOADER AND COMPACTOR FOR TRASH COLLECTING VEHICLES

John W. Pickrell, 4206 N. 68th St., Scottsdale, Ariz. 85251

Division of Ser. No. 770,398, Feb. 22, 1977, Pat. No. 4,113,120.
This application Jul. 10, 1978, Ser. No. 922,849
The portion of the term of this patent subsequent to Sep. 12, 1995, has been disclaimed.
Int. Cl.[2] B65F *3/02*
U.S. Cl. 414—404 **5 Claims**



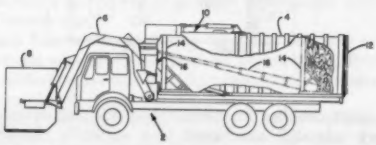
1. A system for handling municipal trash comprising: a front loading vehicle; said vehicle having a steerable chassis; a container removeably mounted on said chassis; means on the front of said vehicle for handling household trash containers and moving them upwardly and backwardly into an upsidedown position; said container having means for receiving trash from said household trash container; a trash compactor actuator on said vehicle chassis; and means for power operating said trash compactor actuator; said container having a pivotal portion operable by said compactor actuator; said pivotal portion being a forward wall of said container moveable about a pivotal axis near the forward lower portion of said container and openable at the upper forward portion thereof; and means to secure and release said forward wall from the trash compactor actuator when the container is loaded and unloaded from the vehicle chassis.

4,173,424

AUTOMATIC PACKING SYSTEM FOR REFUSE VEHICLE

James S. Whitehead, Rockdale, Tex., and Thomas M. Lawson, Knoxville, Tenn., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 21, 1977, Ser. No. 760,897
Int. Cl.[2] B65F *3/14, 3/20*
U.S. Cl. 414—517 **4 Claims**



1. An automatic packing mechanism for refuse compaction bodies including:

a compaction head inside the compaction body and extending across the compaction body,

an hydraulic cylinder connected to said compaction head and to the front of the compaction body,

hydraulic fluid circuit means connected to the hydraulic cylinder so that pressurized hydraulic fluid can flow to and from the hydraulic cylinder to extend and retract the hydraulic cylinder to thereby move the compaction head longitudinally back and forth within the compaction body,

hydraulic cylinder control means including:

(a) a control valve in the fluid circuit means having a first position to direct fluid to the hydraulic cylinder to cause

the cylinder to extend and advance the compaction head rearwardly through the compaction body and a second position to direct fluid to the hydraulic cylinder to cause the cylinder to retract and to return the compaction head back to the front of the compaction body.

(b) an advance solenoid and a return solenoid operatively associated with the control valve to move the valve to the first position and second position respectively upon energization of each solenoid,

electrical circuitry connected to the advance and return solenoids including:

(a) means to energize the advance solenoid

(b) a first pressure sensitive switch positioned in the hydraulic fluid circuit means to sense hydraulic fluid pressure and to close electrical contacts when the fluid directed to the hydraulic cylinder to extend the cylinder reaches a preset pressure,

(c) a first electrical timer positioned electrically in series with the first pressure switch whereby said timer is activated when fluid to the hydraulic cylinder reaches the preset pressure,

(d) electrical contact means associated with the first electric timer to de-energize the advance solenoid and to energize the return solenoid to thereby return the compaction head to the front of the compaction body after the first electric timer has been activated for a preset, relatively short length of time,

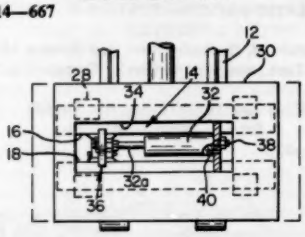
(e) a second pressure sensitive switch positioned in the hydraulic fluid circuit means to sense hydraulic fluid pressure and to de-energize the return solenoid when the pressure of fluid from the hydraulic cylinder as the cylinder retracts drops below a preset low pressure level.

4,173,425

QUICK COUPLING FOR SIDE SHIFT CYLINDER OF LIFT TRUCK ATTACHMENT

Thomas E. Dixon, and Jerry L. Chapman, both of Portland, Oreg., assignors to Brudi Equipment, Inc., Longview, Wash.

Filed Apr. 17, 1978, Ser. No. 896,985
Int. Cl.[2] B66F 9/14
U.S. Cl. 414—667 **8 Claims**



1. A quick coupling for connecting a side shift cylinder of a lift truck side shift attachment to a vertically movable lift carriage of a lift truck in which the lift carriage includes a pair of vertically spaced horizontal carriage frame members having generally vertically extending front faces, said quick coupling comprising:

a pair of mounting block members extending in the space between and affixed to said carriage frame members in positions such that said block members are laterally spaced apart to define with said frame members a mounting space therebetween,

a cylinder mounting plate member having a rearwardly projecting portion sized to fit closely within said mounting space and having a forwardly projecting portion projecting forwardly beyond the front faces of said frame members and overlapping said faces when said rearwardly projecting portion is inserted within said mounting space,

a first pull pin means for removably connecting said rearwardly projecting portion of said plate member to said pair of block members when said rearwardly projecting portion is inserted within said mounting space,

said forwardly projecting portion of said plate member including means defining an opening therethrough for receiving an extensible end portion of said side shift cylinder,

and second pull pin means for removably connecting the extensible end portion of said cylinder to the forwardly projecting portion of said plate member,

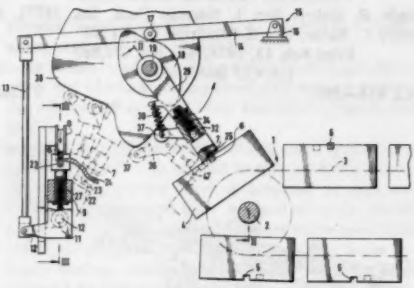
whereby said side shift cylinder can be quickly connected and disconnected from said plate and said plate can be quickly connected and disconnected from said lift carriage.

4,173,426

APPARATUS FOR THE AUTOMATIC LOADING OF A CONTINUOUSLY WORKING MACHINE

Friedrich Schell, Metterstr. 23, 714 Ludwigsburg-Pflugfelden, Fed. Rep. of Germany

Filed Sep. 8, 1977, Ser. No. 831,414
Int. Cl.[2] B65G 25/12
U.S. Cl. 414—737 **21 Claims**



1. An apparatus for automatically loading a continuously operating machine with workpieces, the apparatus comprising:

a rotatably mounted main shaft,

a loading arm means including a means for receiving the workpieces,

a shaft means for pivotally mounting the loading arm means for movement between a workpiece receiving position and a workpiece delivery position,

conveyor means for conveying the workpieces past the continuously operating machine including further means for receiving the workpieces,

gripper means arranged between said loading arm means and said conveyor means for transferring workpieces from said loading arm means, when said loading arm means is in a delivery position, to said further workpiece receiving means on said conveyor means, said gripper means including means for retaining the workpieces therein during a transfer from the loading arm means to said further receiving means, and at least one ram means mounted in the gripper means for causing the workpiece in the gripper means to be inserted into the further workpiece receiving means during a transfer operation,

means for mounting said gripper means at said main shaft so as to be rotatable therewith and also movable relative thereto in a direction of said at least one ram means,

said gripper means and said conveyor means are arranged with respect to one another such that, in a transfer region of the workpiece from the gripper means to the further receiving means, a line extending through a bottom end surface of the gripper means and a line extending through an upper peripheral surface of the further receiving means are brought into a parallel relationship whereby the gripper means executes a relative movement in a direction of

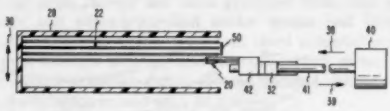
a line connecting centers of the main shaft and a supporting shaft of the conveyor means so that the workpiece in the gripper means is radially inserted into the further receiving means on the conveyor means.

4,173,427

GRIPPING DEVICE FOR MAGNETIC DISKETTES

Wallace E. Beuch, Pine Island, and Michael N. Zell, Rochester, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1978, Ser. No. 888,601
Int. Cl.[2] G11B *17/22*
U.S. Cl. 414—751 **8 Claims**



1. Mechanism for gripping an article and moving it from one place to another and including:

a pair of arm portions mounted with respect to a common support and moveable toward and away from each other so as to embrace the article between them,

spring means for moving said arm portions together so that they grip the article and so that the article is moved along with said common support, and

outwardly diverging cam surfaces formed on facing sides of said arm portions and forming a throat into which the article to be moved may be thrust so as to spread the arm portions apart and cause them to grip the article due to said spring means,

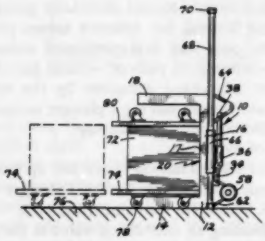
said cam surfaces being of different lengths and said arm portion with the shorter cam surface having an article gripping surface opposite said longer cam surface whereby, as the article travels down the longer cam surface in being withdrawn from between said arm portions, the article frictionally moves on said article gripping surface to be thereby frictionally restrained from being separated from the arm portion having said article gripping surface.

4,173,428

PRINTER'S PAPER PILE INVERTER

John H. Thornberg, Minneapolis, Minn., assignor to Bethany Fellowship, Inc., Minneapolis, Minn.

Filed Oct. 31, 1977, Ser. No. 846,884
Int. Cl.[2] B65G *7/02*
U.S. Cl. 414—766 **4 Claims**



1. A pile inverter for inverting a pile of papers initially positioned on a first pallet supported in spaced relation above a horizontal floor to be finally positioned on a second pallet supported in spaced relation above a floor;

said pile inverter including:

A. a pair of parallel, spaced apart C-frames, each C-frame including:

(1) a first outwardly extending C-frame leg;

(2) a base C-frame leg connected to the first leg and extending at right angles thereto, said base leg being provided with a plane interior surface; and

(3) a second outwardly extending C-frame leg connected to the base leg and extending at right angles thereto to lie in spaced, parallel, aligned relation to the first C-frame leg;

B. a base frame including said base C-frame legs and members extending between said base legs to fixedly support these base legs to have fixed, parallel, spaced apart relation to each other;

C. handle means supported on the base frame adapted to be useful to manually move said pile inverter successively from:

(1) an upright position wherein said first C-frame legs are in contact with a horizontal floor, to

(2) a reclining position wherein said base C-frame legs and said base frame are supported in parallel relation to said floor, and to

(3) an inverted position wherein said second C-frame legs are in contact with said floor;

D. a pallet lift platform supported with respect to said base frame;

E. guide means for supporting said lift platform for movement in direction longitudinally of said base C-frame legs from a first position substantially aligned with a plane defined by the interior surfaces of said first outwardly extending C-frame legs toward a second position in parallel alignment with the first plane but adjacent interior surfaces of said second outwardly extending C-frame legs, said guide means being part of said base frame;

F. jack means supported by said base frame adapted to move said platform from said first toward said second position when the pile inverter is in said upright position and when a pile of papers to be inverted is positioned on a first pallet, the first pallet is positioned over the lift platform, and an inverted second pallet is positioned on top of said paper pile in alignment with and below said second C-frame legs;

G. foot means extending outwardly from said base frame to support said base frame in spaced relation to said floor when said pile inverter is in its reclining position;

H. said handle means being constituted as a pair of handlebars, each positionable alternatively to extend outwardly from and in longitudinal alignment with said base C-frame legs in a first position beyond a first end of said base legs adjacent said first C-frame legs and in a second position beyond a second end of said base legs adjacent said second C-frame legs;

I. said foot means including rotatably mounted transport wheels adjacent to said first end of said base C-frame legs;

J. said foot means also including support feet adjacent to said second end of said base legs; and

K. said transport wheels and said support feet being positioned to provide pivot points on the floor when the inverter is moved between said upright position and said reclining position and between said reclining position and said inverted position, respectively.

4,173,429

CENTRIFUGAL FAN, SHAFT, PLATE AND HUB ASSEMBLY

Joseph H. Hoffman, Norwood, Mass., and Daniel G. Thompson, Plum Borough, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 5, 1977, Ser. No. 857,483
Int. Cl.[2] F04D *17/08*
U.S. Cl. 416—184 **10 Claims**

1. A shaft, fan plate and hub assembly for a centrifugal fan, comprising:

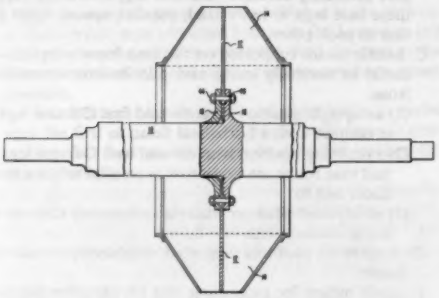
a shaft;

a pair of opposed hubs including a first hub inseparable from said shaft and a second hub ring separable from said shaft;

a disc-shaped fan plate having an inner peripheral margin disposed in sandwiched relation between the opposed faces of said hub and hub ring;

said inner peripheral margin including a thickened ring portion providing oppositely projecting annular shoulders at the outer periphery of the thickened ring portion;

both said hub and said hub ring including annular recesses in their opposing faces to receive said thickened ring portion with the outer peripheries of said recesses in closely abut-



ting relation with said shoulders to provide a shoulder-recess bearing area;

a plurality of fastener means at circumferentially spaced locations around said hub and hub ring and extending in an axial direction through said hub, hub ring and the thickened ring portion;

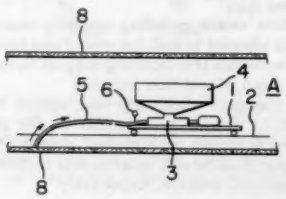
whereby the assembly arrangement results in said shoulder-recess bearing areas being located radially outwardly from the bearing stress areas in the vicinity of the fastener means so that the stress largely arising from thermal transients in the fan are applied for the most part to the shoulder-recess bearing areas.

4,173,430

METHOD OF INJECTING A BACK FILLING INJECTION MATERIAL IN A SHIELD FORMING PROCESS

Seizo Kubota, Musashi-Murayama, Japan, assignor to Sato Kogyo Kabushiki Kaisha, Toyama, Japan

Filed Nov. 22, 1977, Ser. No. 854,072
Int. Cl.[2] F04B *15/00*; E02D *15/02*
U.S. Cl. 417—53 **1 Claim**



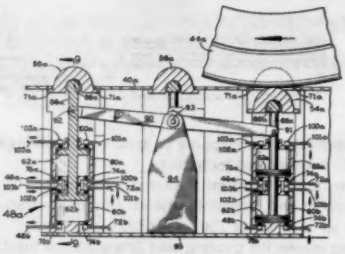
1. A method of injecting a back filling injection material in a shield process, characterized by the steps of reversely rotating an injection pump for a back filling injection material having a hopper connected to its intake port to intake the back filling injection material into said hopper through a delivery hose connected to its delivery port; subsequently presetting an upper limit pressure and a lower limit pressure of said injection pump for injecting said back filling injection material; normally rotating said injection pump to inject said back filling injection material in said hopper to a desired location through said delivery hose; and then, after completion of injection filling of said back filling injection material, reversely rotating said injection pump to intake water within a shield through said deliver hose, thereby effecting washing of said delivery hose and said injection pump.

4,173,431

ROAD VEHICLE-ACTUATED AIR COMPRESSOR AND SYSTEM THEREFOR

Roland L. Smith, Homestead, Fla., assignor to Nu-Watt, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 814,685, Jul. 11, 1977, Pat. No. 4,115,034. This application Jan. 16, 1978, Ser. No. 869,780
Int. Cl.[2] F04B *9/02, 35/00*
U.S. Cl. 417—229 **1 Claim**



1. A road vehicle-actuated system for compressing air and thereby generating electrical energy comprising:

an electricity generator operated by compressed air to generate electricity;

air storage means operatively connected to said generator to supply compressed air to said generator for operating the same;

first nested floating bar actuator means positioned in a roadway for actuation downward in response to motion of a vehicle along the roadway; said actuator means having a plunger nested in a floating bar projecting into the roadway;

a first pair of cylinders;

a first pair of pistons having down and up strokes in said cylinders respectively and coupled to said plunger of said actuator means for movement thereby;

vent means including an inlet check valve at the top of each of said cylinders above said pistons for introducing air into said cylinders above said pistons;

valve-controlled vent means at the bottom of each of said cylinders for introducing air into said cylinders below said pistons during an up stroke thereof; and valve-controlled outlet means at the bottom and top of said each of said cylinders for supplying air compressed by said pistons during a down stroke and up stroke thereof to said air storage means enroute to said electricity generator;

a second nested floating bar actuator means positioned in said roadway past said first-mentioned actuator means along a pre-determined path of vehicle travel along the roadway for downward actuation by the vehicle; said second actuator means having a plunger nested in a floating bar projecting into the roadway;

a second pair of cylinders;

a second pair of pistons having down and up strokes in said second cylinders and coupled to said plunger of said second actuator means for movement thereby;

vent means including an inlet check valve at the top of each of said second cylinders above said second pistons for introducing air into said second cylinders above said second pistons during a down stroke of said second pistons;

valve-controlled vent means at the bottom of each of said second cylinders for introducing air into said second cylinders below said second pistons during an up stroke thereof;

valve-controlled outlet means at the bottom of each of said second cylinder for supplying air compressed by said second pistons during a down stroke thereof to said air storage means enroute to said electricity generator;

valve-controlled outlet means at the top of each of said second cylinders for supplying air compressed by said second pistons during an up stroke thereof to said air storage means enroute to said electricity generator;

and mechanical linkage means acting between said plungers for causing upward movement of either pair of pistons in response to downward actuation of the other pair of pistons;

said system further including third and fourth nested floating bar actuator means and third and fourth pairs of cylinders and pistons having the same construction as said first and second pairs thereof and each provided with inlet vent means and valve-controlled outlet means and linkage means as recited herein with said third actuator means located between said first and second actuator means and said fourth actuator means located beyond said second actuator means in said path of travel.

4,173,432

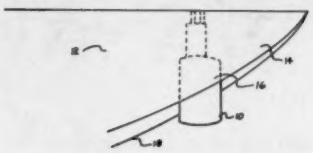
VERTICAL WAVE AIR COMPRESSION DEVICE

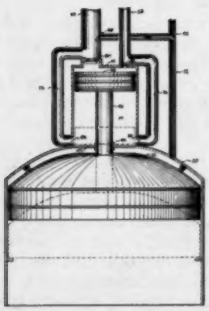
Dorwin J. Vines, P.O. Box 71, South Prarie, Wash. 98385

Filed Apr. 19, 1977, Ser. No. 788,920

Int. Cl.[2] F04B *35/00, 25/02*

U.S. Cl. 417—231 **6 Claims**





1. A pump using the vertical energy of waves comprising:

a compression shell;

a float housed within the compression shell and sealingly engaging the walls thereof;

a compression cylinder arising from atop the compression shell with the inner area of the compression cylinder congruent to a hole in the top of the compression shell;

a piston ram attached to the float so that the piston ram will be housed within the compression cylinder on the rise and fall of the float;

inlet and discharge lines extending from the top of the compression cylinder;

a means for opening the discharge line on the rise of the piston ram and closing the discharge line on the falling of the piston ram;

a means for closing the inlet line on the rising of the piston ram and opening the lines upon the fall of the piston ram;

a third line extending into the compression shell, a fourth line extending from said third line into said inlet line;

means for opening the third line from a source of fluid to the compression shell upon the fall of the float, means for closing the third line from the source of fluid to the compression shell upon the rise of the float;

means for opening the fourth line upon the rise of the float, means for closing the fourth line upon the fall of the float;

a means of attaching the compression shell to the bow of a boat.

4,173,433

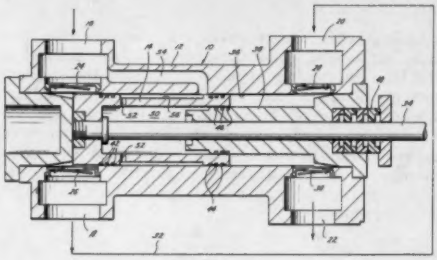
TWO-STAGE GAS COMPRESSOR

John M. Anderson, P.O. Box 5202, Corpus Christi, Tex. 78405

Filed Feb. 6, 1978, Ser. No. 875,257

Int. Cl.[2] F04B *3/00, 5/00, 25/00, 21/08*

U.S. Cl. 417—254 **2 Claims**



1. In a two-stage gas compressor having a housing with a first-stage inlet and outlet and a second-stage inlet and outlet, a double acting piston having two sets of piston rings reciprocal in a cylinder in the housing and reciprocal about a stationary member having piston rings engaging an interior cavity of the piston and a piston rod sealingly extending through the housing, the improvement comprising,

an opening through the piston between the two sets of piston rings, and

a passageway in the housing extending between the first stage inlet and the cylinder at a position at all times between the two sets of piston rings thereby remaining in communication with the opening whereby gas bypassing any of the piston rings will pass to the first-stage inlet and unnecessary compression of gas in the piston is avoided.

4,173,434

PRESSURE REGULATOR FOR A FLUID PUMP

Robert T. J. Skinner, High Wycombe, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Dec. 9, 1977, Ser. No. 858,943

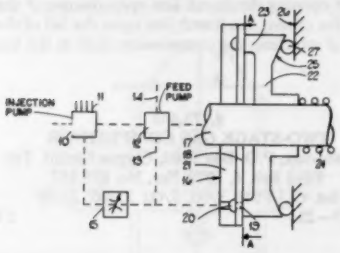
Claims priority, application United Kingdom, Dec. 17, 1976, 52940/76

Int. Cl.[2] F04B *49/00*

U.S. Cl. 417—294 **3 Claims**

1. A pressure regulator for controlling the pressure at the outlet of a fluid pump in accordance with the speed at which the pump is driven comprising a rotary shaft arranged to be driven at the same speed as the pump, a first member in the form of a disc, a central aperture in said disc and through which said shaft extends, an orifice in said disc at a position spaced from the axis of rotation of the shaft, said orifice breaking out onto the opposite side faces of the disc, a second member in the form of a rotor carried on said shaft so as to rotate therewith but to be axially movable thereon, a side face defined on said rotor for engagement with one of the side faces of said

disc to obturate said orifice, resilient means biasing said rotor into engagement with said disc, an annular surface defined on said rotor, said surface being inclined to a plane normal to the axis of rotation of the shaft, means defining a reaction surface presented to said annular surface, a plurality of balls disposed between said reaction surface and said annular surface and which when the rotor and shaft rotate move outwardly under the action of centrifugal force to impart an axial thrust to said rotor, the magnitude of said thrust depending upon the square



of the speed at which the rotor is driven, a backing plate having a side face located against the other of said side surfaces of said disc and passage means in said backing plate through which said orifice is in communcation with said outlet, the fuel pressure at the outlet of the pump acting to separate said disc and said rotor in opposition to said axial thrust and to the force exerted by the resilient means, whereby the output pressure of the pump will be controlled in accordance with the law N_2+K where N is the speed of rotation of the shaft and K the constant of the resilient means.

4,173,435

PLUNGER PUMP

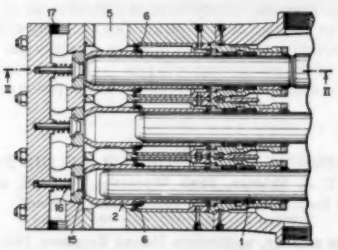
Paul Hammelmann, Oelde, Fed. Rep. of Germany, assignor to Paul Hammelmann Maschinenfabrik, Oelde, Fed. Rep. of Germany

Filed Apr. 7, 1977, Ser. No. 786,041

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1976, 2615531

Int. Cl.[2] F04B *19/02, 21/00*

U.S. Cl. 417—469 **10 Claims**



1. A pump comprising, in combination, a pump housing defining a pumping chamber and having an end wall; an elongated plunger at least partly accommodated in said pumping chamber and mounted in said pump housing for reciprocation longitudinally thereof toward and away from said end wall of said pump housing between a retracted and an extended position; a sleeve valve surrounding a portion of said plunger and mounted thereon for displacement longitudinally of said plunger and for limited reciprocation therewith between a first position in which said sleeve valve is spaced from said end wall of said pump housing, and a second position in which said sleeve valve sealingly abuts said end wall of said pump housing and subdivides said pumping chamber into a suction space around said sleeve valve and a pressure space within said sleeve valve; an inlet port communicating with said suction space; an outlet port communicating with said pressure space in said second position of said sleeve valve; a one-way valve in said outlet port which opens when said plunger moves toward said extended position thereof and said sleeve valve is in said second position thereof for discharging pressurized medium from said pressure space into said outlet port; and at least one resilient sealing member so extending between and sealingly connected to said sleeve valve and to said pump housing as to simultaneously permanently urge said sleeve valve toward said second position thereof and seal said suction space.

4,173,436

PIVOTABLE PIPE SLIDE FOR USE IN A TWO CYLINDER CONCRETE PUMP

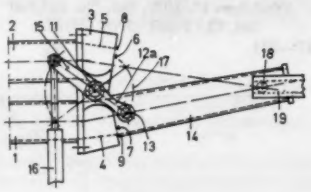
Heinz Bille, Unna, Fed. Rep. of Germany, assignor to Maschinenfabrik Walter Scheele KG, Unna-Massen, Fed. Rep. of Germany

Filed Jun. 1, 1978, Ser. No. 911,727

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1977, 2725089

Int. Cl.[2] F04B *15/02*

U.S. Cl. 417—516 **6 Claims**



1. A pivotable slide for use in a two-cylinder concrete pump having two discharge openings, each of which is bordered by a sealing face, comprising:

a swing pipe having an end segment which is reciprocably pivotable in a pivot plane perpendicular to the planes of the sealing faces; and

pivot means for reciprocally pivoting said end segment of said swing pipe between a first end position, in which said end segment is pressed against the sealing face of one of said discharge openings, and a second end position, in which said end segment is pressed against the sealing face of the other of said discharge openings, said pivot means moving said end segment away from contact with said sealing faces during the pivoted movement thereof between said first and second end positions, said pivot means including a movable joint having an axis which is disposed normally relative to the pivot plane of said end segment and which is coupled to said end segment, a fixed joint, spaced from said movable joint and disposed centrally between said discharge openings and having an axis which is parallel to said movable joint and a guide joint which is coupled to said movable joint and is pivotable about said fixed joint.

4,173,437

DUAL-PISTON RECIPROCATING PUMP ASSEMBLY

George T. Leka, Trumbull, and Roland C. Paradis, Bridgeport, both of Conn., assignors to The Perkin-Elmer Corporation, Norwald, Conn.

Filed Aug. 1, 1977, Ser. No. 820,592

Int. Cl.[2] F04B *23/06;* **F16J** *15/18*

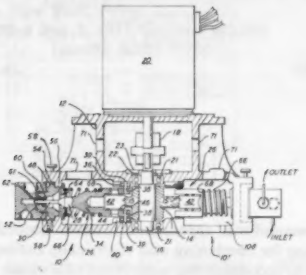
U.S. Cl. 417—521 **9 Claims**

1. A dual-piston reciprocating pump assembly comprising two opposed substantially identical reciprocating pumps, a housing within which said pumps are mounted, motor means, a coupling, a cam shaft, and a cam, said cam being mounted on

the cam shaft which is driven through the coupling by the motor means, and bearing means for mounting said cam shaft in the housing;

each of said reciprocating pumps including a piston assembly comprising a piston body having a piston end, a cam follower mounted on the other end of the piston body for engaging the cam face of said cam;

a cylinder head having a piston cylinder therein for receiving the piston end, said housing having an end opening for receiving said cylinder head, bearing means disposed in said piston cylinder for said piston end, means mounting a guide bushing in said cylinder head adjacent said bearing means for the piston end, means mounting a high-pressure seal adjacent the bearing means, said piston end having



substantial radial end play, and a piston spring, means mounting said piston spring for urging the pistion inwardly to maintain said cam follower in engagement with the cam face of said cam;

said high-pressure seal comprising an annular flexible sealing ring having an annular wiper lip and an annular backup lip, a circumferentially oriented coiled spring disposed between said lips to urge the wiper lip against said piston end, said wiper lip being adapted to engage said piston end along an end edge thereof at the high-pressure side of the high-pressure seal, and said two lips being oriented to face the high-pressure side of the seal so that the fluid pressure in the pump assembly tends to spread the lips and enhance the sealing action.

4,173,438

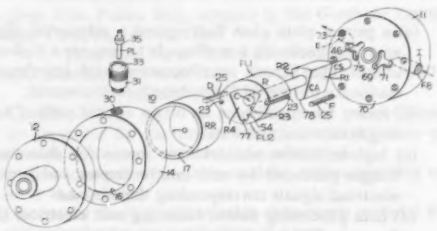
ROTARY PISTON DEVICE WHICH DISPLACES FLUID IN INNER AND OUTER VARIABLE VOLUME CHAMBERS SIMULTANEOUSLY

A. Frank Putz, 401 N. 89th St., Wauwatosa, Wis. 53226

Continuation-in-part of Ser. No. 632,853, Nov. 17, 1975, Pat. No. 4,030,861. This application May 18, 1977, Ser. No. 798,232

Int. Cl.[2] F04C *1/02*

U.S. Cl. 418—59 **17 Claims**



1. A rotary piston expansible chamber device comprising, in combination,

a housing having a cylindrical bore and diametrically opposed intake and exhaust ports adjacent at least one axial end of said bore,

a cylindrical piston rotatable within said bore and being lenticular in cross section and having arcuately spaced apices which maintain substantially continuous contact with said bore and divide it into first and second expansible outer chambers defined between the flanks of said lenticular piston and said bore adapted to to alternately communicate with said intake port and with said exhaust port as said piston rotates, said piston having a compartment therein.

a shaft rotatable about an axis parallel to but offset from the bore axis and having a member integral therewith disposed within and movable within said compartment and forming with the compartment walls at least one expansible inner chamber adapted to communicate with said intake port and also with said exhaust port as said piston rotates, and

means including said member disposed within said compartment for operatively connecting said piston to said shaft so that they rotate together in a one-to-one ratio and simultaneously reciprocate said piston within said bore so that the volume of said first and of said second outer chamber varies between maximum and minimum during each revolution of said shaft and also move said member within said compartment so that the volume of said inner chamber varies between minimum and maximum during each revolution of said shaft,

said diametrically opposed intake and exhaust ports being positioned so that each can communicate with only one of said outer chambers at a time and so that both said ports are out of communication with said outer chambers when the outer peripheral flanks of said piston are repectively in closest proximity to said bore.

4,173,439

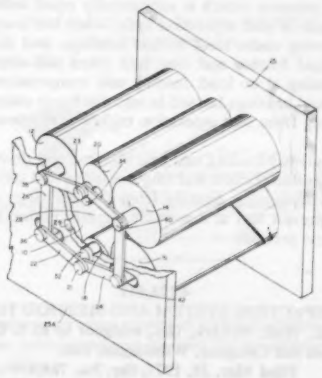
APPARATUS HAVING EXPANDING AND CONTRACTING CHAMBER

Walter M. Hopkins, 1306 W. Glenoaks Blvd., Glendale, Calif. 91201

Filed Nov. 28, 1977, Ser. No. 855,294

Int. Cl.[2] F01C *1/02, 11/00*; F03C *3/00*

U.S. Cl. 418—58 **14 Claims**



1. An apparatus having at least one alternately expanding and contracting chamber comprising a pair of parallel end plates; a plurality of cylindrical rollers each having their axes parallel to each other, normal to said end plates and in sealing engagement at their ends with the respective adjacent surface of said end plates; each of said rollers having an exterior surface in rolling engagement with two adjacent rollers, said rollers defining with said end plates an enclosed chamber; and wherein at least one of the rollers rotates about an axis eccen-

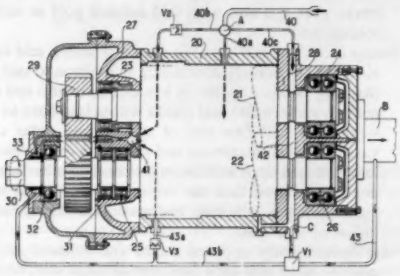
tric with respect to the axis of said roller to move reciprocally into and out of the chamber formed by said rollers and said end plates, and means communicating between said chamber and the exterior thereof.

4,173,440

METHOD AND DEVICE FOR LUBRICATING COMPRESSORS

Fernand Libis, Illkirch Graffenstaden, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Jun. 8, 1978, Ser. No. 913,924
Claims priority, application France, Jun. 17, 1977, 77 18646
Int. Cl.[2] F04C *29/02*
U.S. Cl. 418—84 **8 Claims**



1. A method of lubricating a fluid compressor of the type comprising a suction casing, a discharge casing, means including said casings forming a compression chamber, bearings carried by said casings, at least two intermeshed helical screws supported by said bearings for rotation about their axes within said chamber, and at least one drive means for driving said helical screws, said drive means including a drive shaft, a friction seal ring for sealing of said shaft on the suction side thereof, said compressor further comprising an oil separation tank, and said compressor comprising suction and discharge ends, the improvement comprising the steps of:

feeding lubricating oil coming from said separation tank at high pressure which is substantially equal to that which prevails in said separation tank, when the compressor is operating under load, to said bearings, said drive means and said friction seal ring, and when said compressor is operating at no load, feeding said compression chamber and said bearings housed in said discharge casing with oil coming from said separation tank, but at a low pressure, and

independently feeding said bearings and said drive means as well as said friction seal ring housed in said suction casing with oil coming directly from the discharge end of the compressor and at a pressure slightly higher than atmospheric pressure.

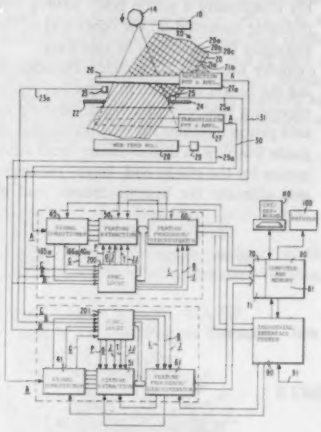
4,173,441

WEB INSPECTION SYSTEM AND METHOD THEREFOR

William E. Wolf, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 28, 1977, Ser. No. 781,879
Int. Cl.[2] G01N *21/02*
U.S. Cl. 356—431 **3 Claims**

1. An inspection system for web materials that includes electronic means responsive to means scanning the web for detecting a plurality of different nonuniform appearance features of the web, said electronic means comprising: means for electrically discriminating said appearance features as to a predefined class to identify the significant electrical signal components thereof; means for electrically dividing the web into frames; means for counting the number of occurrences of said significant signal components over a series of scans within each of said frames; means for comparing each count of the number of occurrences of said significant signal components within each frame with predetermined values to electrically



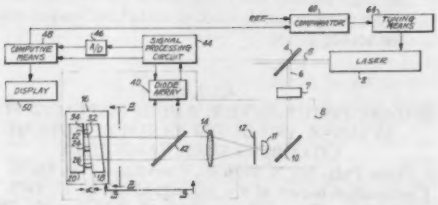
define nonuniform appearance features according to frame; and means for combining said electrically defined nonuniform features to recognize the occurrence of a visual defect class as it occurs within each said scanned frame.

4,173,442

APPARATUS AND METHOD FOR DETERMINATION OF WAVELENGTH

James J. Snyder, Clarksburg, Md., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed May 27, 1977, Ser. No. 801,272
Int. Cl.[2] G01B *9/02*
U.S. Cl. 356—346 **13 Claims**



1. Apparatus for measuring to very high resolution the wavelength of a beam of radiation incident thereon, comprising:

(a) a pair of plain glass flats spaced a substantial distance apart and enclosing a small angle to provide a high-order, multi-fringe Fizeau interferometer, said interferometer stationary during said wavelength measurement;

(b) means for establishing an origin optical path of known length between said flats;

(c) high-resolution photoelectric means for detecting the fringes produced by said interferometer and providing electrical signals corresponding thereto; and

(d) data processing means receiving said electrical signals for:

(i) determining to high resolution the average spacing between said detected fringes and computing therefrom to high resolution the wavelength of said incident radiation;

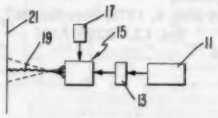
(ii) determining to high resolution the optical path length between said flats at a fringe near said original path;
(iii) computing from said high-resolution wavelength and said high-resolution optical path length a high-resolution measure of the order number of said high-order interferometer;
(iv) rounding to the nearest integer said computed measure of said order number; and
(v) computing from said integer order number said very high-resolution measurement of said incident wavelength.

4,173,443

SPRAY SPINNING NOZZLE HAVING CONVERGENT GASEOUS JETS

Victor J. Lin, Berkeley Heights, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Jun. 1, 1977, Ser. No. 802,342
Int. Cl.[2] B29D *31/00*
U.S. Cl. 425—66 **10 Claims**



1. A spray spinning nozzle for producing a substantially continuous filament from molten synthetic resinous polymeric material comprising:
nozzle means for receiving the material under pressure from a source of molten material, having a distal end with an opening therein and a fluid passage therethrough;
shaping means for forming a filament from the material, removably connected at the opening in fluid communication with the fluid passage and having an axis and an extrusion orifice; and,
attenuation means for supplying gaseous jets angularly spaced about the axis, each jet converging on the axis at the same point, the attenuation means being laterally movable into and out of operative position with respect to the shaping means and including:
at least three conduits, each having an exhaust opening, being aligned to direct a gaseous jet at an angle to the center line, and the exhaust openings being angularly spaced about the axis; and,
manifold means for supplying pressurized gas to the three conduits, having the three conduits connected thereto and extending so that the exhaust openings are downstream of the shaping means.

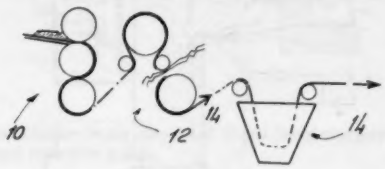
4,173,444

EQUIPMENT FOR PRODUCING CONTINUOUS TAPES OF RUBBERY VULCANIZABLE MATERIAL, FOR THE MANUFACTURE OF HOSE ARTICLES

Deregibus Alfio, Padua, Italy, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 13, 1977, Ser. No. 841,790
Claims priority, application Italy, Apr. 5, 1977, 23157 A/77
Int. Cl.[2] B29C *15/00*
U.S. Cl. 425—363 **3 Claims**

1. In apparatus for the production of continuous tape of vulcanizable elastomeric material, in combination:
(i) at least one pair of counter-rotatable rollers coacting to serve as a calender
(ii) means for feeding vulcanizable elastomeric material to said calender for the production of a tape
(iii) a cooling assembly to receive said tape from the calender, said cooling assembly including:
(a) a plurality of cooling cylinders each having a cylindrical outer wall and first and second axial end walls, said first end wall having an axial opening, an internal wall spaced from and connected to said outer wall and said end walls and defining therewith a chamber to receive coolant fluid, inner and outer radially-spaced concentric hollow shafts coupled for rotation in unison, said inner shaft having said internal wall secured thereon, said outer hollow shaft being connected to said first end wall about said axial opening, said inner hollow shaft extending into said cylinder and through said internal wall and opening adjacent



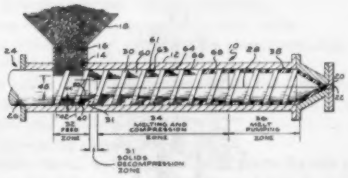
said second end wall, whereby a continuous flow path for coolant fluid is established between said inner and outer hollow shafts over the whole internal surface of said cylinder, and
(b) a respective pair of guide rollers disposed adjacent the cylindrical outer wall, said guide rollers being closely spaced angularly with respect to an axis of rotation of the cylinders such that tape material may be passed about said guide rollers and about a major part of each cylindrical outer wall.

4,173,445

PLASTICS EXTRUSION APPARATUS

James M. McKelvey, St. Louis, Mo., and Samuel Steingiser, Bloomfield, Conn., assignors to Monsanto Company, St. Louis, Mo.

Filed Jul. 17, 1978, Ser. No. 925,375
Int. Cl.[2] B29F *3/06*
U.S. Cl. 425—376 A **10 Claims**



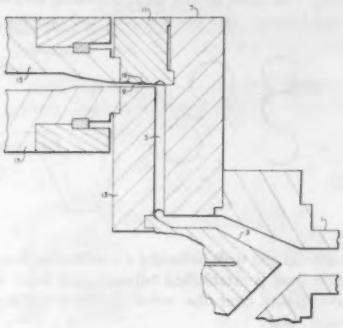
1. In plastics extrusion apparatus which includes:
a hollow cylinder having an inlet for containing a bed of solid plastic;
a rotatable screw within said cylinder defining with said cylinder a helical channel for the plastic comprising in series, a feed zone beneath the inlet and a melting zone;
the improvement which comprises:
a solids decompression zone between the feed zone and the melting zone having increased free volume relative to the feed zone;
whereby before significant melting occurs the bed of solid plastic is decompressed to the extent that the channel in the solids decompression zone is partially filled.

4,173,446

CHOKE RING FOR PIPE EXTRUSION DIE

Olaf E. Larsen, Dallas, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 21, 1977, Ser. No. 817,766
Int. Cl.[2] B29D *23/04*
U.S. Cl. 425—380 **5 Claims**



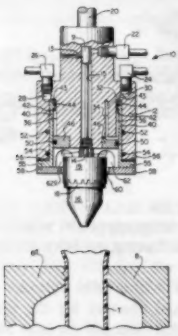
1. In a pipe extrusion device in which polymer flows from an extruder into a spreader cone, through a plurality of individual channels in a distribution plate and through a choke passage for blending the plurality of flow streams from the distribution plate to form the sidewall of an extruded pipe, the improvement of a choke passage comprising in its outer wall a plurality of elongated cavities, each cavity diminishing in depth and width from its upstream end to reach zero depth and width as the passage extends downstream across the line of polymer flow, said cavities being spaced between and overlapping at least an end of the nearest cavity on either side viewed in the direction of polymer flow.

4,173,447

APPARATUS FOR CONTACT COOLING THE NECK MOIL OF BLOWN HOLLOW CONTAINERS

John R. Bradbury, Kansas City, Mo., assignor to Ethyl Development Corporation, Baton Rouge, La.

Filed Sep. 5, 1978, Ser. No. 939,284
Int. Cl.[2] B29C *17/07, 17/12*
U.S. Cl. 425—526 **8 Claims**



1. An apparatus for cooling the neck moil of a container while it is in a blow mold, said apparatus comprising:

a. a body portion, said body portion having a first connecting means for connecting said body portion to the rod of a blow pin cylinder and a second connecting means for connecting a blow pin stem to said body portion, said blow pin stem carrying a blow pin, a cutting collar and a rotation collar;

b. a blow air channel in said body portion for providing pressurized gas to said blow pin;

c. an annular cylinder in said body portion;

d. an annular piston fittable within said annular cylinder, said piston having attached thereto a cooling plate for pressing said moil onto said blow mold;

e. a first inlet means communicative with said annular cylinder for supplying pressurized gas to said annular cylinder to move said piston towards said moil; and

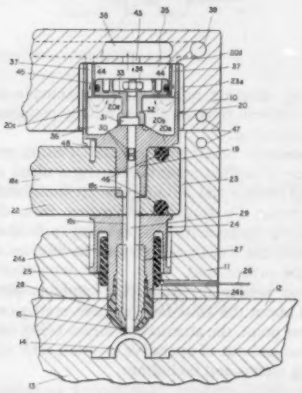
f. a second inlet means communicative with said annular cylinder for supplying pressurized gas to said annular cylinder to move said piston away from said moil.

4,173,448

ACTUATING MECHANISM FOR GATE VALVE OF INJECTION NOZZLE

Herbert Rees, Willowdale, and Robert D. Schad, Schomberg, both of Canada, assignors to Husky Injection Molding Systems, Bolton, Canada

Filed Jan. 6, 1978, Ser. No. 867,506
Int. Cl.[2] B29F *1/05*
U.S. Cl. 425—549 **7 Claims**



1. In an injection-molding machine including a hot-runner structure with a sprue channel for conveying liquefied plastic material from a pressure chamber to an injection gate,

the combination therewith of valve means for alternately blocking and unblocking said injection gate, said valve means comprising:

a rod having a free end located at said injection gate for selectively obstructing same;

a cylinder remote from said injection gate provided with an end wall and a peripheral wall bounding an internal space, said end wall having an opening slidably receiving said rod;

a cover plate separated by said cylinder from said structure with formation of an air space surrounding said peripheral wall;

a piston head in said internal space connected with the other end of said rod, said peripheral wall being centered on an axis perpendicular to said cover plate and terminating at a face of said cylinder opposite said end wall in contact with said cover plate, said face having an aperture giving access to said internal space, said peripheral wall being divided into a thickened wall portion proximal to said face and a reduced wall portion proximal to said end wall, said wall portions meeting at an internal shoulder between said end wall and said face, said piston head being guided by said thickened wall portion and being provided with stop means limiting its stroke to less than the axial length of

said thickened wall portion, the latter having at least one bore generally parallel to said axis extending from said face to said shoulder and communicating at said shoulder with said internal space;

conduit means including passages in said cover plate communicating with said bore and with said aperture; and

control means connected to said conduit means for alternately admitting a pressure fluid to said aperture and to said bore with resulting reciprocation of said piston head and said rod.

4,173,449

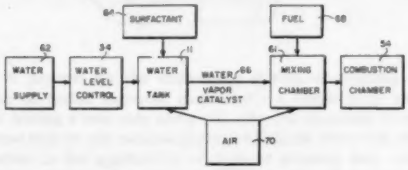
SURFACTANT SYSTEM FOR FUEL CATALYZER

Seymour Israel, 40-06 45 St. (4F), New York, N.Y. 11104

Continuation of Ser. No. 678,532, Apr. 20, 1976, abandoned. This application Mar. 15, 1978, Ser. No. 886,762

Int. Cl.[2] F23J *7/00*

U.S. Cl. 431—4 **19 Claims**



1. A method of adding finely dispersed liquid water and water vapor to combustion air in a fuel-air combustion system which includes a means for forced intake of a stream of said combustion air, said method comprising:

(a) generating a quantity of aqueous bubbles from a solution of bubble-enhancing surfactant in water, said solution having a lower surface tension than water; and

(b) entraining said aqueous bubbles at a controlled rate into said combustion air stream.

4,173,450

DEVICE FOR INJECTING AIR PROCESSED TO INCREASE ITS HUMIDITY INTO OIL BURNING FURNACES

Jerome Schrank, Jamaica, N.Y., assignor to Allied Energy Corporation, Beverly Hills, Calif.

Continuation-in-part of Ser. No. 712,227, Aug. 27, 1976, abandoned, and Ser. No. 671,621, Mar. 29, 1976, abandoned. This application Dec. 29, 1977, Ser. No. 851,360

Int. Cl.[2] F23J *7/00*

U.S. Cl. 431—190 **2 Claims**

1. A device for injecting air processed to increase its humidity into oil burning furnaces comprising:

a. a water container dimensioned to receive and contain water received from a water line;

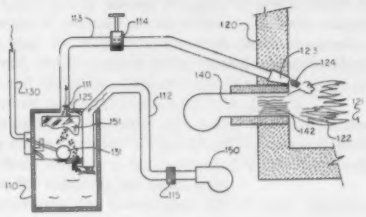
b. an atmospheric line leading from the atmosphere into said water container, at a location below the level of water within said container;

c. first means for drawing and bubbling atmospheric air through the water container, to process the air by increasing its humidity;

d. means for inductively sensing whether a motor in said oil burning furnace is energized;

e. a blower connected to said atmospheric line; and

f. means for stopping and starting said blower connected to said atmospheric line, said means for stopping and starting



said blower being connected to and being energizable by said inductive means.

4,173,451

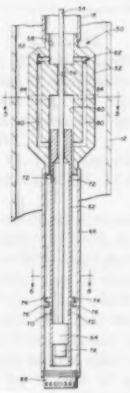
DOWNHOLE PUMP

Harold Moore, Jr., Dallas, Tex., assignor to Reserve Oil, Inc., Denver, Colo.

Filed May 8, 1978, Ser. No. 904,022

Int. Cl.[2] F04B *19/02*

U.S. Cl. 417—457 **13 Claims**



1. A downhole pump, which comprises:

a pump body having upper and lower ends;

means defining fluid passageways interconnecting the ends of the pump body;

check valve means positioned within the fluid passageway means for permitting fluid flow from the lower end to the upper end of the pump body;

a reciprocating piston; and

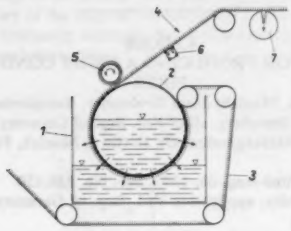
a slidable barrel with a plurality of ports therein extending from the lower end of the pump body in surrounding relationship with the piston, said barrel being responsive to reciprocation of the piston for movement between an inner position wherein certain of the ports are aligned with the fluid passage means, and an outer position wherein all of the ports are outside the pump body.

4,173,452

PROCESS FOR THE CONTINUOUS DYEING OR PRINTING OF LENGTHS OF MATERIAL

Hans Fleissner, Riehen, Switzerland, assignor to Vepa AG, Switzerland

Filed Apr. 18, 1977, Ser. No. 788,536
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1976, 2617145
Int. Cl.[2] D06B 5/02
U.S. Cl. 8—1 XB 3 Claims



1. A process for the continuous dyeing or printing of a length of textile material, particularly a velour-type carpet panel having a base side and a pile side, the materials forming the base and/or pile sides including shrinkable fibers which are set prior to the application of dyes or printing inks, which comprises transporting the length of material with the pile side under pressure to a sieve drum having a perforated circumferential support surface, guiding the length of material onto the circumferential support surface of the sieve drum with the backside of the textile material lying on the support surface, forcing a hot liquid medium from within said sieve drum outwardly through the length of material in the direction of tips of the pile whereby the pile is spread and made upright during the flow of the liquid medium therethrough and the shrinkable fibers are set by said hot liquid medium with the pile in the spread and upright state and thereafter transporting the length of material with the pile surface not under pressure to and through a cooling zone to cool the length of material and the hot liquid contained therein.

4,173,453

TOPICAL HAIR COLORING FORMULATION IN THE FORM OF SUSPENSION, LOTION AND CREAM

Chyn-Duog Shiah, Manhasset, N.Y., assignor to CDC Research Inc., New York, N.Y.

Continuation-in-part of Ser. No. 675,485, Apr. 9, 1976, abandoned. This application Mar. 9, 1978, Ser. No. 884,964
Int. Cl.[2] A61K 7/13
U.S. Cl. 8—10.1 19 Claims

1. A composition for coloring gray hair for topical application which comprises as active coloring agent, a salt selected from the group consisting of copper cystine or zinc cystine in an amount of about 0.1 to 8% by weight of said composition in admixture with sulfur in finely divided form in an amount of about 0.5 to 20% of said composition in an aqueous pharmaceutically acceptable vehicle for topical application.

4,173,454

METHOD FOR REMOVAL OF SULFUR FROM COAL IN STOKER FURNACES

Sidney M. Heins, 6033 N. Sheridan Rd., Chicago, Ill. 60660

Continuation-in-part of Ser. No. 816,310, Jul. 18, 1977, abandoned. This application Nov. 29, 1978, Ser. No. 964,619
Int. Cl.[2] C10L 9/10
U.S. Cl. 44—1 SR 5 Claims

1. A method of removal of sulfur from coal having released hygroscopic moisture from the combustion zone in the fuel bed of a stoker furnace wherein the temperature is between the oxidation temperature of the sulfur and the ignition temperature of the coal comprising the steps:

(a) Pulverizing the coal;

(b) Pulverizing a mineral oxide selected from the oxides of the spinel group having the general composition AB_2O_4 wherein A consists of the mineral elements magnesium, iron, zinc, tin, titanium and manganese or any combination thereof, and B consists of the mineral elements aluminum, iron and chromium, both groups of mineral elements with electrode potential above that of hydrogen;

(c) Mixing the pulverulent coal and at least a stoichiometrically correct amount of the pulverulent mineral oxide, one of which contains at least a trace of a pulverized catalytic agent for oxidizing sulfur dioxide;

(d) Introducing the pulverulent mix of coal, mineral oxide and catalytic agent into the combustion zone of said furnace; and

(e) Precipitating the sulfur from the zone of combustion as the sulfates of the mineral elements in the selected mineral oxide.

3. A method of removal of sulfur from coal as set forth in claim 1 wherein the mineral oxide from the spinel group comprises:

(a) A natural-occurring material selected from the group consisting of flue dust from steel-making containing ferrite, red-mud from aluminum-making, retort residue from zinc-making and tailings from the mining of ores of zinc, copper or manganese.

4,173,455

FIRE-SAFE HYDROCARBON FUELS

George E. Fodor; William D. Weatherford, Jr., and Bernard R. Wright, all of San Antonio, Tex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 11, 1978, Ser. No. 950,501
Int. Cl.[2] C10L 1/18
U.S. Cl. 44—51 10 Claims

1. A stabilized aqueous diesel fuel emulsion comprising: (a) 1–17% by volume of water, (b) 2–6% by volume of an emulsifier consisting of at least 60% oleyl diethanolamide, 8 to 14% by weight diethanolamine soap of oleic acid, 16 to 24% by weight free diethanolamine, to which emulsifier has been added 0 to 7½% by weight oleic acid under conditions causing it to react with an equivalent amount of free diethanolamine, thereby leaving essentially no free oleic acid in the final emulsifier blend, (c) 0–0.5% by weight of an antimist agent with average molecular weight of at least 5 million, and (d) the remainder being a diesel fuel.

4,173,456

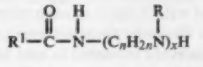
POLYOLEFIN/ACYLATED POLY(ALKYLENEAMINE) TWO COMPONENT FUEL ADDITIVE

Harold J. Scheule, Woodstown, N.J., and Roy E. Starn, Jr., West Chester, Pa., assignors to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Feb. 6, 1978, Ser. No. 875,621
Int. Cl.[2] C10L 1/18, 1/22
U.S. Cl. 44—62 15 Claims

1. A gasoline additive composition comprising

(i) a hydrocarbon-soluble, acylated, poly(alkyleneamine) of the formula



wherein

R is selected from at least one of H and R′—C(O)—;

R^1 is C_9 to C_{23} hydrocarbyl;

n is 2, 3, or a mixture of 2 and 3; and

x is 2 to 6; and

(ii) from about 1 to 10 parts per part of said poly(alkyleneamine) of a normally liquid, hydrocarbonsoluble polymer of a C_2 to C_6 olefin, said polymer having an average molecular weight of about 400 to 3000.

4,173,457

HARDFACING COMPOSITION OF NICKEL-BONDED SINTERED CHROMIUM CARBIDE PARTICLES AND TOOLS HARDFACED THEREOF

Thomas J. Smith, LaPorte, Tex., assignor to Alloys, Incorporated, Baytown, Tex.

Filed Mar. 23, 1978, Ser. No. 889,277
Int. Cl.[2] C04B *31/16*; B24D *3/08*
U.S. Cl. 51—309 **34 Claims**

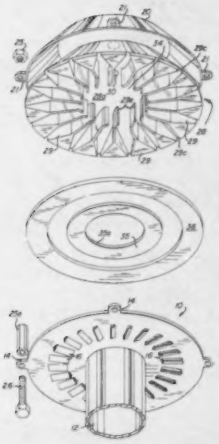
1. A tool for use in the penetration of earthen formations wherein the tool has at least one region of steel subject to excessive wear, said tool having an improved hardfacing on such region of sintered chromium carbide particles metallurgically bonded to the tool by a matrix consisting essentially of the underlying steel of said tool alloyed with the particles at the interfaces therebetween, with the interfaces being free from any brittle intermetallic compound such as would interfere with the alloy bond between the particles and matrix, said particles being in the size range of 10 to 60 mesh and being present in an amount for effective abrasion resistance, the particles comprising metal carbide grains of chromium carbide of an average grain size in the range of 0.5 to 25 microns disposed in a binder comprising a major portion of nickel.

4,173,458

AIR CLEANER

Arthur G. Stiles, 4581 Allison St., Wheatridge, Colo. 80033

Continuation-in-part of Ser. No. 771,241, Feb. 28, 1977, abandoned. This application Oct. 5, 1978, Ser. No. 948,671
Int. Cl.[2] B01D *45/14*
U.S. Cl. 55—405 **6 Claims**



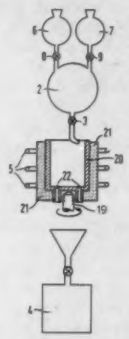
1. An air cleaner for an air line comprising:
(a) housing means having cover means and a bottom housing member which are arranged with respect to each other to define a narrow, peripheral air outlet therebetween;
(b) a freely rotating rotor, rotatively mounted in said housing means in proximity to said cover means;
(c) said rotor having a series of spaced impeller vanes terminating at their distal end adjacent said peripheral air outlet and constructed and arranged with a substantially reduced outlet space between said vanes and terminating at their medial ends short of the rotor axis so as to leave a central opening communicating with the space between the vanes;
(d) a central air outlet in said housing means in communication with said rotor central opening and arranged for a communicating connection with an air line; and
(e) air inlet means in said housing means intermediate said peripheral air outlet and said central air outlet in direct communication with said impeller vanes on said rotor, and constructed and arranged to rotate incoming air whereby incoming air rotates said rotor.

4,173,459

METHOD FOR PRODUCING A LIGHT CONDUCTING FIBER

Hubert Aulich, Munich; Josef Grabmeier, Kempfenhausen, and Hans Pink, Starnberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Aug. 26, 1977, Ser. No. 828,150
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1976, 2638991
Int. Cl.[2] C03B *37/02*
U.S. Cl. 65—3 A **5 Claims**



1. A method for producing a light conducting fiber, particularly a gradient glass-like fiber having a radially changing index of refraction, said method comprising providing a rotating, heatable crucible having a cylindrical interior wall; successively depositing glass forming layers from a liquid phase with the first layer being deposited on the interior wall of the rotating crucible and the subsequent layers being deposited on previously deposited layers, by providing a liquid phase consisting of a water-free solution having compounds of glass forming oxides of at least one element selected from a group consisting of Se, Te, P, As, Si, Ge, Sn, Pb, Ti, B, Al, Mg, Ca, Sr, Ba, Li, Na, K and Rb, and said solution having a solution medium selected from a group consisting of lower ketones, lower alcohols, esters of lower alcohols with lower carboxylic acid and combinations thereof; then thermally decomposing each layer into a glass film; to form a workpiece having a plurality of concentric, cylindrical glass films; and subsequently pulling a fiber from said workpiece.

4,173,460

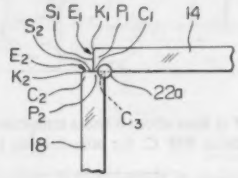
PROCESS FOR WELDING PLATE GLASSES TOGETHER

Yoshihiro Ebata, Kawanishi; Tsutomu Ueno, Ikeda; Nagamasa Kataoka, Kawanishi, and Akimasa Akao, Higashi-murayama, all of Japan, assignors to Agency of Industrial Science and Technology and Central Glass Company, Limited

Filed May 25, 1978, Ser. No. 909,692
Claims priority, application Japan, May 26, 1977, 52/62007
Int. Cl.[2] C03C *27/00*
U.S. Cl. 65—40 **9 Claims**

1. A process for welding first and second plate glasses, comprising:

contacting an edge of the first plate glass with an edge of the second glass, each edge forming part of an edge portion of each plate glass, the step of contacting the edges of the first and second plate glasses including the steps of placing the edge of the first plate glass on the edge of the second plate glass so that the flat surface of the edge of the first plate glass is angularly arranged relative to the flat surface of the edge of the second plate glass, and contacting a corner of the edge of the first plate glass to the flat surface of the edge of the second plate glass at a location such that the corner of the edge of the first plate glass is in a spaced apart relationship between the two corners of the edge of the second plate glass;



heating the whole of the contacted first and second plate glasses to a first predetermined temperature;

locally heating the contacted edge portions of the first and second plate glasses to a second predetermined temperature which is higher than that in the other portions of the plate glasses and lower than the softening temperature of the plate glasses, said second predetermined temperature being higher than said first predetermined temperature; and

passing electric current to the contacted edge portions through a pair of electrodes which are in contact with both side surfaces of the contacted edge portions, respectively, to generate heat for welding the edges of the first and second plate glasses.

4,173,461

METHOD OF BENDING GLASS PLATE

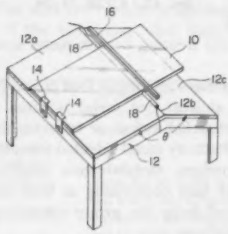
Yoshihiro Ebata, Kawanishi; Tsutomu Ueno, Ikeda; Nagamasa Kataoka, Kawanishi, and Akimasa Akao, Higashi-murayama, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo and Central Glass Company, Limited, Ube, both of, Japan

Filed May 25, 1978, Ser. No. 909,691

Claims priority, application Japan, May 26, 1977, 52-62009

Int. Cl.[2] C03B *23/02*

U.S. Cl. 65—106 **7 Claims**



1. A method of bending a glass plate along a line traversing the glass plate, comprising the steps of:

(a) providing a pair of electrodes in contact with the glass plate respectively at two terminals of said line;

(b) heating a substantially entire portion of the glass plate by first heater means arranged in spaced-apart relationship with said glass plate so as not to cause softening of the glass plate;

(c) heating the glass plate more intensely only in a zone which traverses the glass plate with a narrow width and contains the entire length of said line while step (b) is continued by the use of a second heater means arranged at a short distance from the glass plate to radiate heat along said line such that only said zone of the glass plate is heated to a temperature at which the glass plate does not yet soften but exhibits an appreciable lowering of its electrical resistivity;

(d) applying a voltage to said electrodes to cause an electric current to flow between said electrodes through said zone of the glass plate while steps (b) and (c) are continued such that only said zone of the glass plate is further heated by the Joule effect of said current and softened; and

(e) bending the glass plate while said zone remains softened so as to give a bend along said line contained in the softened zone.

4,173,462

PHENOXYBENZYLPHOSPHONIUM SALT HERBICIDES AND PLANT GROWTH REGULANTS

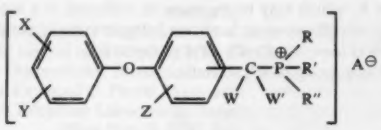
Michael J. Brown, Randolph Township, Morris County, N.J., assignor to GAF Corporation, New York, N.Y.

Filed Dec. 16, 1977, Ser. No. 861,162

Int. Cl.[2] A01N *9/36, 5/00*

U.S. Cl. 71—86 **21 Claims**

1. A plant growth inhibiting composition comprising an inert carrier and an inhibitor, said inhibitor consisting essentially of a compound having the formula:



wherein $A^{\ominus}$ is a halogen anion; X, Y and Z are each independently hydrogen, a halogen atom or haloalkyl group of from 1 to 4 carbon atoms; R, R′ and R″ are each independently phenyl, halophenyl, haloalkylphenyl of from 7 to 12 carbon atoms or alkyl of from 1 to 6 carbon atoms, optionally substituted with halogen; W is hydrogen, —CHO or $—CHN(R''')_2$ where each R‴ is independently hydrogen or alkyl of from 1 to 4 carbon atoms, optionally substituted with halogen; and W′ is hydrogen or represents a bond forming a double bond between C and W when W is $—CHN(R''')_2$ an inert carrier therefor.

4,173,463

PHOSPHONIUM SALTS AS HERBICIDES

Larry W. Peterson, Oakdale; Gene A. Bozarth, and Kurt H. G. Pilgram, both of Modesto, all of Calif., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 31, 1978, Ser. No. 956,457

Int. Cl.[2] A01N *9/36*

U.S. Cl. 71—87 **1 Claim**

1. A method for controlling unwanted plant growth which comprises applying to the foliage of the unwanted plant an effective dosage of a compound of the formula

$$(R)_3P^{\oplus}—CH_2—X—R'.hal^{\ominus} \quad (I)$$

wherein R is naphthyl, or is phenyl or phenalkyl optionally substituted by from one to three moieties selected from alkyl of from 1 to 6 carbon atoms, middle halogen, nitro, amino, and trifluoromethyl, and when R is phenalkyl it contains from 1 to 4 carbon atoms in the linking alkyl moiety, with from 1 to 2 carbon atoms linking the phenyl moiety to the phosphorus

atom; or is alkyl of from 1 to 12 carbon atoms, or cycloalkyl of from 5 to 6 carbon atoms; X is —O—, —S—, —SO— or SO_2—; R′ is alkyl of from 1 to 4 carbon atoms, alkenyl of from 3 to 5 carbon atoms, or is phenyl or substituted phenyl as defined for R; hal is chlorine, bromine or iodine.

4,173,464

m-PHENOXYBENZAMIDE DERIVATIVES

Hiroshi Noguchi, Toyonaka; Shunichi Hashimoto, Takarazuka; Shigeyoshi Kitamura, Toyonaka; Takashi Matsuo, Iruma; Akihiko Mine, Kawanishi, and Katsuzo Kamoshita, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

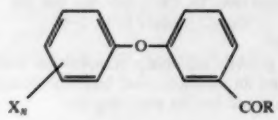
Filed Apr. 29, 1977, Ser. No. 792,221

Claims priority, application Japan, May 7, 1976, 51-52430; May 13, 1976, 51-54989; Oct. 6, 1976, 51-120754; Dec. 28, 1976, 51-160388

Int. Cl.² C07 *103/22;* A01N *9/20, 9/22, 9/02*

U.S. Cl. 71—118 **21 Claims**

1. A herbicidal composition which comprises as an active ingredient a herbicidally effective amount of a m-phenoxybenzamide compound of the formula:



wherein X, which may be the same or different, is a halogen atom, C_1–C_4 alkoxy or at least one halogen atom in combination with at least one C_1–C_6 alkyl group, n is an integer of 1 to 5 and R is a group of the formula:

in which R_1 is a hydrogen atom or a C_1–C_6 alkyl or C_3–C_4 alkenyl group and R_2 is a C_1–C_6 alkyl, C_3–C_4 alkenyl, C_3–C_5 alkynyl, C_3–C_6 cycloalkyl, C_2–C_3 haloalkyl or C_1–C_3 alkoxy-substituted C_2–C_3 alkyl group, and an inert carrier.

4,173,465

METHOD FOR THE DIRECT REDUCTION OF IRON USING GAS FROM COAL

David C. Meissner, and Charles W. Sanzenbacher, both of Charlotte, N.C., assignors to Midrex Corporation, Charlotte, N.C.

Filed Aug. 15, 1978, Ser. No. 933,691

Int. Cl.² C21B *13/02*

U.S. Cl. 75—35 **6 Claims**

1. In a method for reducing iron oxide in a direct reduction furnace wherein hot reducing gas is introduced to said furnace to reduce the iron oxide therein to a metallized iron product and to form a CO_2 containing spent reducing gas, the improvement comprising:

a. removing a substantial portion of the CO_2 from said spent reducing gas to form a reductant-rich gas;

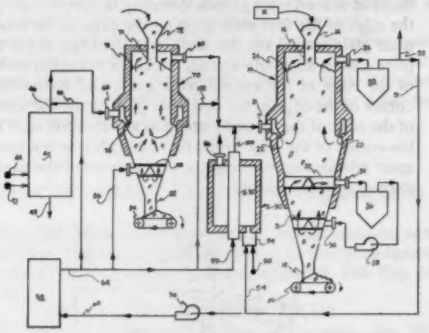
b. gasifying fossil fuel to form a hot gasifier gas;

c. tempering said hot gasifier gas with a first stream of said reductant-rich gas to form a hot gas mixture;

d. reacting said hot gas mixture with a sulfur acceptor to form a hot desulfurized gas;

e. heating a second stream of said reductant-rich gas; and

f. mixing said heated second stream of reductant-rich gas with hot desulfurized gas to form a reducing gas having a



quality of at least about 8 and a temperature of from about 760° to about 900° C. for introduction to said furnace.

4,173,466

MAGNESIUM-CONTAINING TREATMENT AGENTS

John R. McLaughlin; Michael D. Bryant, both of Birmingham, England; Manfred Fessel, and Kenneth C. Taylor, both of Borken, Fed. Rep. of Germany, assignors to Foseco International Limited, Birmingham, England

Filed Dec. 6, 1977, Ser. No. 857,897

Claims priority, application United Kingdom, Dec. 6, 1976, 50847/76; Feb. 11, 1977, 5807/77

Int. Cl.² C21C *7/02*

U.S. Cl. 75—58 **13 Claims**

1. A treatment agent which is a compacted mixture comprising particulate iron, magnesium and calcium, wherein

(1) the magnesium content is 5 to 15% by weight

(2) the weight ratio of magnesium to calcium is in the range of from 1:1 to 8:1

(3) the iron has a purity of at least 95% by weight and a particle size of all less than 0.5 mm and

(4) the mixture is compacted into a body of density at least 4.3 gm/cm^3.

4,173,467

PROCESS FOR RECOVERING VALUABLE METALS FROM SUPERALLOY SCRAP

Barry H. Rosof, Indianapolis, Ind., assignor to Cabot Corporation, Boston, Mass.

Filed May 26, 1978, Ser. No. 909,729

Int. Cl.² C22B *23/04*

U.S. Cl. 75—119 **15 Claims**

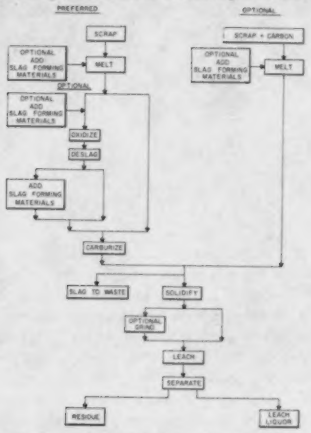
1. A method for treating certain metal scraps which comprises:

providing an initial scrap metal feed containing the combination of (a) at least one metal selected from the group consisting of nickel, cobalt or mixtures thereof, and (b) at least one refractory metal selected from the group consisting of chromium, molybdenum, tungsten and mixtures thereof, said feed comprising at least one acid resistant alloy selected from the group consisting of cobalt and nickel base alloys;

melt carburizing said feed sufficiently to at least predominantly insolubilize the metals of group (b) with respect to the aqueous acid leach step below and to render the group (a) metals of said acid resistant alloy contained in said feed soluble in said acid leach step; and

non-electrolytically leaching the melt carburized feed with aqueous acid leach liquor having dissolving power for the

metals of group (a), whereby said metals of group (a) pass predominantly into solution in said liquor while the metals



of group (b) remain predominantly as undissolved leach residue.

4,173,468

ALLOY FOR SOLDERING ALUMINUM

Frank M. Gault, 148 High Tor Dr., Watchung, N.J. 07060

Filed May 5, 1978, Ser. No. 903,073

Int. Cl.[2] C22C *11/00*

U.S. Cl. 75—134 N **1 Claim**

1. A solder alloy composition consisting, by weight, 5.0 to 65.0 percent bismuth, 0.05 to 95.0 percent lead, 0.05 to 55.0 percent cadmium, 0.05 to 10.0 percent silver, 0.05 to 15.0 percent antimony, 0.005 to 5.0 percent cobalt, 0.005 to 5.0 percent copper, 0.005 to 5.0 percent manganese and 0.005 to 5.0 percent nickel.

4,173,469

MAGNESIUM ALLOYS

William Unsworth, Aspull; John F. King, Bury, and Stephen L. Bradshaw, Bolton, all of England, assignors to Magnesium Elektron Limited, Swinton, England

Continuation-in-part of Ser. No. 645,225, Dec. 29, 1977, abandoned. This application Oct. 25, 1977, Ser. No. 844,939

Claims priority, application United Kingdom, Dec. 30, 1974, 56021/74

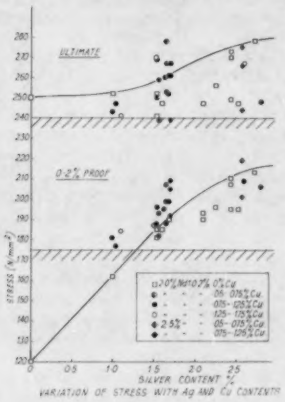
Int. Cl.[2] C22C *23/00*

U.S. Cl. 75—168 F **7 Claims**

1. A cast magnesium base alloy which when heat treated has a 0.2% proof stress of at least 175 N/mm^2 and an ultimate tensile strength of at least 240 N/mm^{2}at ambient room temperature, consisting of the following other than iron and other impurities:

Magnesium	at least 88%
Silver	from 1 to 2% by weight
Copper	from 0.05 to 0.15% by weight
Rare Earth Metals of which at least 60% by weight are Neodymium	from 0.5 to 3.0% by weight
Zirconium	nil to 1% by weight
Manganese	nil to 2% by weight
Zinc	nil to 0.5% by weight
Cadmium	nil to 1.0% by weight
Lithium	nil to 6.0% by weight
Calcium	nil to 0.8% by weight
Gallium	nil to 2.0% by weight
Indium	nil to 2.0% by weight
Thallium	nil to 5.0% by weight
Lead	nil to 1.0% by weight
Bismuth	nil to 1.0% by weight

the maximum quantities of zirconium and manganese being



limited by their mutual solubility in the alloy.

4,173,470

NOVOLAK PHOTORESIST COMPOSITION AND PREPARATION THEREOF

Susan Fahrenholtz, Bloomfield, N.J.; David T. Long, Orefield, and Raymond C. Pitetti, Wescosville, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

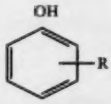
Filed Nov. 9, 1977, Ser. No. 849,754

Int. Cl.[2] G03C *1/68, 5/00, 1/52;* A47G *27/04*

U.S. Cl. 430—5 **8 Claims**

1. Method for the preparation of a positive photoresist which comprises the steps of

(a) reacting at least one cresol with a condensation agent selected from the group consisting of aldehydes and reactive ketones, said condensation agent having less than 10 carbon atoms and at least one carbonyl group per molecule, and a hydroxylated aromatic of the general formula



wherein R is an alkyl group having from 3–15 carbon atoms, said reaction being effected in the presence of a condensation catalyst,

(b) heating the reaction mixture to reflux over a time period ranging from 12 to 24 hours,

(c) subjecting the resultant mixture to vacuum distillation at a temperature ranging from 200–300 degrees C., and

(d) adding a photosensitizing agent and a solvent to the resultant product.

6. Method for forming a patterned resist on the surface of a substrate which comprises exposing a portion of the composition of claim 1 on said substrate to ultraviolet radiation having a wavelength with the range of 2000 to 5000 Angstroms for a time period sufficient to react the photosensitizer so as to solubilize the resist and selectively removing the exposed pattern from said substrate.

4,173,471

AGE-HARDENABLE TITANIUM CARBIDE TOOL STEEL

M. Kumar Mal, Spring Valley, and Stuart E. Tarkan, Monsey, both of N.Y., assignors to Chromalloy American Corporation, West Nyack, N.Y.

Filed Jan. 27, 1978, Ser. No. 872,907
Int. Cl.[2] B22F 5/00; C22C 33/02, 38/14, 29/00
U.S. Cl. 75—237 4 Claims

1. A sintered age-hardenable titanium carbide tool steel composition comprising by volume about 15% to 50% primary grains of titanium carbide dispersed through a high cobalt-containing steel matrix making up the balance and consisting essentially by weight of about 10% to 25% cobalt, about 5% to 20% chromium, about 0.5% to 5% molybdenum, 0 to 2% nickel, 0 to 0.15% carbon and essentially the balance at least about 50% iron.

3. As an article of manufacture, a die element made of an age-hardened titanium carbide tool steel composition comprising by volume about 15% to 50% primary grains of titanium carbide dispersed through a high cobalt containing steel matrix making up the balance and consisting essentially by weight of about 10% to 25% cobalt, about 5% to 20% chromium, about 0.5% to 5% molybdenum, 0 to 2% nickel, 0 to 0.15% carbon and essentially the balance at least about 50% iron.

4,173,472

POLYESTER INTERLAYER AND BINDER COMPONENT IN MULTILAYER PHOTOCONDUCTIVE ELEMENT

Martin A. Berwick, Kendall, and Edgar E. Riecke, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 696,248, Jun. 15, 1976, abandoned. This application Feb. 14, 1977, Ser. No. 768,460
Int. Cl.[2] G03G 5/04, 5/14
U.S. Cl. 43u—60 8 Claims

1. In a unitary multilayer photoconductive element having a photoconductive insulating composition in electrical contact with a conductive layer, the improvement wherein said element comprises, as an interlayer between said photoconductive insulative composition and said conducting layer, an amorphous, water-insoluble polyester selected from the group consisting of

(a) polyesters having recurring units derived from at least one aromatic dicarboxylic acid component and at least one diol component, at least one of said acid or diol components being a non-linear monomer selected from the group consisting of an isophthalic acid component or a branched-chain alkylenediol having the formula

$$HO—CH_2—R^1—CH_2—OH$$

wherein R^1 is a branched-chain alkylene group, and

(b) polyester copolymers having recurring units derived from at least one aromatic dicarboxylic acid component and at least one diol component, at least one of said acid or said diol components being a mixture of at least two different acids or two different diols, respectively, so that a copolyester is obtained, and at least one of said acid or one of said diol components being selected from the group consisting of a nonlinear monomer as defined above or a cycloaliphatic diol.

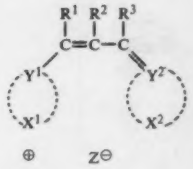
4,173,473

RADIATION SENSITIVE COMPOSITIONS CONTAINING PYRYLIUM COMPOUNDS

Constantine C. Petropoulos, Webster; George A. Reynolds, and James A. Van Allan, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 6, 1977, Ser. No. 813,371
Int. Cl.[2] G03G 5/09
U.S. Cl. 430—72 4 Claims

1. A photoconductive composition comprising an electrically insulating material containing a sensitizing amount of a pyrylium-type salt having the formula:



wherein:

each of X^1 and X^2, which may be the same or different, represents oxygen, sulfur, or selenium;

each of Y^1 and Y^2, which may be the same or different, represents the atoms necessary to complete a heterocyclic unsaturated ring nucleus having 6 or 10 ring atoms including a selenium, sulfur or oxygen hetero ring atom and 5 or 9 carbon ring atoms;

each of R^1, R^2, and R^3, which may be the same or different, represents hydrogen, halogen, cyano, nitro, alkyl having 1 to about 4 carbon atoms in the alkyl group, or aryl, with the proviso that at least one of R^1, R^2, or R^3 represents aryl; and

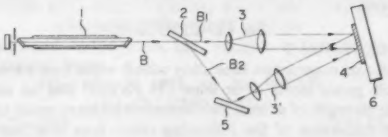
$Z^{\ominus}$ represents an anionic function.

4,173,474

HOLOGRAM AND METHOD OF PRODUCTION USING TWO SOLVENT TREATMENTS

Takashi Tanaka, Tokyo, and Katsuhiko Nishide, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1977, Ser. No. 819,420
Claims priority, application Japan, Jul. 27, 1976, 51-89487
Int. Cl.[2] G03C 5/04, 5/00, 5/24
U.S. Cl. 430—1 9 Claims



1. A method of producing a hologram comprising:

(A) a first step wherein a sensitive member is prepared by dispersing a photopolymerizable substance into a polymer by which a carrier is formed,

(B) a second step of exposing said member to an interference pattern of radiation rays,

(C) a third step of contacting the exposed sensitive member with a first solvent capable of providing a difference in swelling in accordance with the interference pattern formed in the sensitive member, and

(D) a fourth step of contacting the exposed sensitive member with a second solvent which is miscible with the first solvent, but relatively weak in swelling action to the sensitive member whereby a hologram having an unexpectedly high diffraction efficiency relative to the thickness of the sensitive member is formed.

4,173,475

LATENT IMAGE THICK REFRACTIVE INDEX RECORDINGS

Edwin A. Chandross, Berkeley Heights, and Walter J. Tomlinson, III, Holmdel, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 31, 1977, Ser. No. 801,783
Int. Cl.[2] G03C 5/04, 1/72
U.S. Cl. 430—290 8 Claims

1. A latent-image process for recording refractive index patterns in a thick medium comprising an exposure step wherein a photosensitive body is irradiated with a light pattern followed by a development step wherein a refractive index change corresponding to said light pattern is established in said photosensitive body, characterized in that said photosensitive body is a porous rigid matrix having a pore size of at least 10 A and having photosensitive sites comprising a photosensitive material which has a sufficiently strong adhesion to said rigid matrix to prevent substantial disengagement of said photosensitive compound prior to the completion of said development step wherein said photosensitive sites upon irradiation with said light pattern during said exposure step undergo a photochemical change which destroys the ability of said photosensitive sites to initiate polymerization, said photochemical change occurring without appreciably changing the refractive index in said photosensitive body and said development step comprises filling the pores of said photosensitive body with a reactive composition and producing refractive index changes in said reactive composition by supplying sufficient radiant energy to activate the photosensitive sites remaining after said exposure step thereby initiating polymerization in said reactive composition.

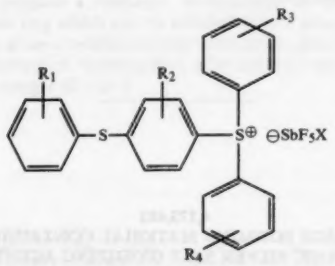
4,173,476

COMPLEX SALT PHOTOINITIATOR

George H. Smith, Maplewood, and Peter M. Olofson, North St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 8, 1978, Ser. No. 876,114
Int. Cl.[2] G03C 5/04, 1/68; C07F 9/90; C08F 8/18
U.S. Cl. 430—280 12 Claims

1. A triarylsulfonium complex salt of the formula:



where X is F or OH; R_1, R_2, R_3 and R_4 are each selected from H, lower alkyl, alkoxy, or halogen.

4,173,477

PHOTOGRAPHIC MATERIAL WITH DEVELOPER IN AZX EMULSION AND SUBLAYER

Keisuke Shiba, Shizuoka; Kikuo Kubotera, and Akira Kashiwabara, both of Asaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jul. 18, 1977, Ser. No. 816,764
Claims priority, application Japan, Jul. 16, 1976, 51-84861
Int. Cl.[2] G03F 7/02; G03C 1/48
U.S. Cl. 430—264 27 Claims

1. A silver halide photographic element comprising an aluminum support having thereon an anodized aluminum oxide layer, a subbing layer on the anodized aluminum oxide layer and a silver halide developing agent-containing light sensitive silver halide emulsion layer on the subbing layer, said subbing layer containing a silver halide and a silver halide developing agent in a molar amount less than the amount thereof contained in the light sensitive layer, wherein the said silver halide developing agent is 4-phenyl catechol and wherein said anodized aluminum oxide layer has been subjected to a graining treatment.

4,173,478

PHOTOGRAPHIC MATERIALS COMPRISING AZO SENSITIZING DYES

Colin Holstead, Abbots Langley; Kenneth N. Kilminster, Linslade Leighton Buzzard, and Michael J. Simons, Eastcote Ruislip, all of England, assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 846,665, Oct. 28, 1977. This application Jul. 31, 1978, Ser. No. 929,879
Int. Cl.[2] G03C 1/02
U.S. Cl. 430—353 22 Claims

21. A method of developing an image in an exposed photothermographic element comprising a support having thereon in reactive association;

a. an oxidation-reduction image-forming combination comprising:
   i. a silver salt oxidizing agent with
   ii. a reducing agent;
b. a photosensitive component consisting essentially of photosensitive silver halide spectrally sensitized with
c. at least one azo spectral sensitizing dye

represented by the formula:

A—N=N—B

wherein A comprises at least one 5 to 12 membered heterocyclic ring having a —NH— moiety as part of the ring which enables the dye to form a substantially water-insoluble silver salt which heterocyclic ring is linked directly or through a second diazo group; and B is either 6 to 14 membered aryl or a 5 to 12 membered heterocyclic ring; said method comprising heating the element to about 100° C. to about 250° C. until an image is developed for about 1 to about 60 seconds.

4,173,479

COLOR PHOTOGRAPHIC RECORDING MATERIAL

Erwin Ranz, Leverkusen; Joachim W. Lohmann, Kuerten, and Heinz-Dieter Schütz, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Jan. 31, 1978, Ser. No. 873,739
Claims priority, application Fed. Rep. of Germany, Feb. 5, 1977, 2704797
Int. Cl.[2] G03C 1/76
U.S. Cl. 430—507 3 Claims

1. A color photographic recording material comprising

(a) a layer support, and applied thereon

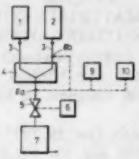
(b) several differently sensitized silver halide emulsion layers containing non-diffusible color couplers of which emulsion layers at least two are sensitive to red light and have different sensitivities and of which at least another two are sensitive to green light and have different sensitivities, the more sensitive of the two red-sensitive and the more sensitive of the two green-sensitive silver halide emulsion layers forming a comparatively more sensitive emulsion layer unit which is arranged further away from the layer support than each of the less sensitive red-sensitive and the less sensitive green-sensitive silver halide emulsion layers, and of which emulsion layers at least one is sensitive to blue light and is arranged further away from the layer support than each of the red-sensitive and the green-sensitive silver halide emulsion layers, and

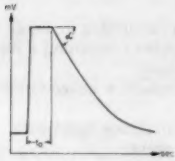
(c) at least one yellow filter layer which is arranged further

away from the layer support than each of the red-sensitive and the green-sensitive silver halide emulsion layers and, optionally,

(d) other non-photosensitive layers,

wherein the improvement comprises an additional silver halide emulsion layer of comparatively low sensitivity, in which the silver halide contains from 20 to 100 mol % of silver chloride, the balance being silver bromide and the silver halide particles have an average grain diameter of less than 0.5 μm, and which





contains a non-diffusible compound capable of reacting with color developer oxidation products to release a diffusible silver halide development inhibitor, said compound having at 20° C. and at pH 10.2 an effective reaction rate constant in the coupling reaction with 2-methyl-N-ethyl-N-β-hydroxyethyl-p-phenylene diamine of between 200 and 4000 [1. mole^{-1}·sec^{-1}], is arranged within the comparatively more sensitive emulsion layer unit between the red-sensitive and the green-sensitive silver halide emulsion layer.

4,173,480

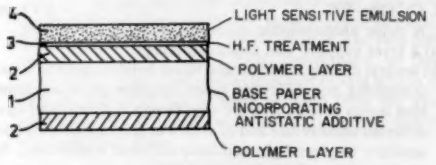
PHOTOGRAPHIC SHEET WITH SYNTHETIC HECTORITE ANTISTATIC ADDITIVE AS SIZING OR BACKCOAT

Antony I. Woodward, Amersham, England, assignor to Wiggins Teape Limited, Beaconsfield, England

Continuation of Ser. No. 601,426, Aug. 4, 1975, abandoned. This application Apr. 11, 1978, Ser. No. 895,480

Int. Cl.^{2} G03C *1/82, 1/78*

U.S. Cl. 430—536 **10 Claims**



1. A photographic sheet material element, adapted for carrying a radiation-sensitive layer for receiving a photographic image, which comprises a support having incorporated therewith an antistatic additive composition as a sizing or a backcoat, said antistatic additive composition comprising synthetic hectorite clay having a layered structure, the layers of which are electrically charged and said layers being magnesium silicate lattice structure in which magnesium ions are bound in octadhedral relationship with hydroxyl ions.

4,173,481

METHOD OF HARDENING GELATIN AND PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Hidefumi Sera; Tsumoru Ishii; June Yamaguchi, and Hisashi Shiraishi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

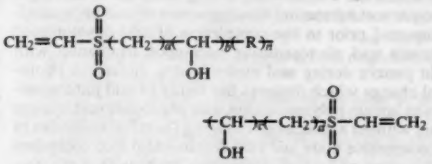
Filed Nov. 1, 1977, Ser. No. 847,520

Claims priority, application Japan, Nov. 4, 1976, 51/132929

Int. Cl.^{2} G03C *1/30*

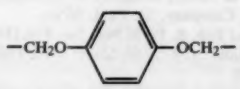
U.S. Cl. 430—621 **9 Claims**

1. A photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion layer with the photographic light-sensitive material having one hydrophilic colloid layer containing gelatin and/or a gelatin derivative hardened with a compound of the following general formula (I):



(I)

wherein a and d each represents 1 or 2; b and c each represents 0, 1 or 2 with the proviso that both b and c are not simultaneously 0; R represents a divalent group selected from the group consisting of a cyclic hydrocarbon group having 6 to 12 carbon atoms, an acyclic hydrocarbon group having 1 to 8 carbon atoms, a $-CH_2OCH_2-$ group, a $-(CH_2CH_2O)_2CH_2CH_2-$ group, a $-CH_2CH_2OCH_2CH_2-$ group and a



group; and is 0 or 1.

4,173,482

DRY IMAGE FORMING MATERIAL CONTAINING AN ORGANIC SILVER SALT OXIDIZING AGENT, A REDUCING AGENT AND A HALOGEN MOLECULE

Kageyasu Akashi; Yoshio Hayashi; Tatsumi Arakawa; Takeo Kimura, and Hidehiko Kobayashi, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 8, 1978, Ser. No. 884,529

Claims priority, application Japan, Mar. 16, 1977, 52-28088; Mar. 16, 1977, 52-28089; Jun. 14, 1977, 52-69424

Int. Cl.^{2} G03C *1/02*

U.S. Cl. 430—619 **8 Claims**

1. A dry image forming material capable of forming an image by preliminary heating, imagewise exposure to light, and heat development thereof, said material comprising (a) a non-photosensitive organic silver salt oxidizing agent, (b) a reducing agent for a silver ion and (c) at least one halogen molecule selected from the group consisting of a bromine molecule, an iodine molecule, iodine chlorides, iodine bromide and bromine chloride.

4,173,483
SILVER HALIDE PHOTOGRAPHIC EMULSIONS FOR USE IN FLASH EXPOSURE

Teiji Habu; Tomio Nakajima; Eiichi Sakamoto; Noboru Fujimori, and Kiyomitsu Mine, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Nihonbashi-Muro, Japan

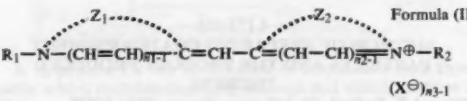
Filed May 25, 1976, Ser. No. 690,042
Claims priority, application Japan, May 27, 1975, 50-63672
Int. Cl.[2] G03C *1/08, 1/14*
U.S. Cl. 430—575 **5 Claims**

1. A silver halide photographic emulsion for use in flash exposure which comprises at least one compound containing a metal belong to Group VIII of the periodic table in an amount of 10^{-8} to 5×10^{-7} mole per mole of silver halide and at least one of sensitizing dyes represented by the formula (I) or (II) and capable of sensitizing silver halide at less than 550 nm;

Formula (I)

wherein R is selected from the group consisting of alkyl, allyl, aryl, substituted alkyl selected from the group consisting of β-sulfoethyl, γ-sulfopropyl, δ-sulfobutyl, γ-sulfobutyl, β-(γ-sulfopropoxy)ethyl, β-(δ-sulfothiobutoxy)ethyl, β-hydroxyethyl, β-hydroxy-γ-sulfopropyl, carboxymethyl and β-carboxyethyl, and substituted aryl selected from the group consisting of p-chlorophenyl and p-carboxyphenyl; Z represents a non-metallic group necessary to complete a nitrogen-containing heterocyclic ring selected from the group consisting of pyrroline, thiazoline, thiazole, benzothiazole, naphthothiazole, selenazole, benzoselenazole, naphthoselenazole, oxazole, benzoxazole, naphthoxazole, imidazole, benzoimidazole, pyridine, quinoline, and indole; Q represents a non-metallic group necessary to complete a rhodanine, thiohydantoin or thiooxazolidine-dione ring which may be substituted by a group selected from the group consisting of lower alkyl, lower alkoxy, sulfoalkyl, carboxyalkyl, hydroxyalkyl, allyl and aryl; and n represents an integer of 1 or 2;

Formula (II)



wherein R_1 and R_2 individually are selected from the group consisting of alkyl, allyl, aryl, substituted alkyl selected from the group consisting of β-sulfoethyl, γ-sulfopropyl, δ-sulfobutyl, γ-sulfobutyl, β-(γ-sulfopropoxy)ethyl, β-(δ-sulfothiobutoxy)ethyl, β-hydroxyethyl, β-hydroxy-γ-sulfopropyl, carboxymethyl and β-carboxyethyl, and substituted aryl being selected from the group consisting of p-chlorophenyl and p-carboxyphenyl; Z_1 and Z_2 individually represent a non-metallic group necessary to complete a pyridine, pyrroline, oxazole, thiazole or selenazole ring; X^- represents an anion; and n_1, n_2 and n_3 individually represent an integer of 1 or 2; provided that n_3 is 1 when a sensitizing dye of the general formula forms an inner salt.

4,173,484
ARTIFICIAL STONE AND METHOD FOR MAKING

Imre Kubovits; Imre Mészáros, both of Budapest; Ferenc Kaszatnitzky; Mrs. László Szabó, both of Tatabánya, and Péter Ottlik, Budapest, all of Hungary, assignors to Tatabányai Szénbányák, Tatabanya, Hungary

Continuation-in-part of Ser. No. 369,142, Jun. 12, 1973, abandoned. This application Apr. 7, 1977, Ser. No. 785,327
Claims priority, application Hungary, Jun. 12, 1972, TA 1191
Int. Cl.[2] C03C *3/22*
U.S. Cl. 106—39.6 **11 Claims**

1. A method for the production of white or throughout colored acid-and base-resistant high-strength artificial stone, comprising preparing a starting material containing from about 30 to about 60% SiO_2, from 0 to about 5% Al_2O_3, from 0 to about 2% $FeO+Fe_2O_3$, from about 5 to about 30% MgO, from about 20 to about 40% CaO, and from about 2 to about 10% Na_2O and/or K_2O, which composition is outside the vitrification range of the system defined by these components, by mixing sand, dolomite and/or limestone, and sodium carbonate and/or cryolite, melting the starting material which contains no nucleating agents at a temperature between about 1,250° and about 1,400° C., casting the melt into a form, and subjecting the melt to spontaneous crystallization without reheating, between about 1,250° and about 1,000° C. for a period from about 0.5 to about 1.5 hours to form a crystallized mass essentially without a glassy phase, and thereafter cooling the crystallized mass.

9. The product of the process of claim 1.

4,173,485
PRODUCTION OF ZINC AND ALKALINE EARTH METAL TITANATES

Peter Woditsch; Gerhard Winter; Günter Linde, all of Krefeld, and Friedhelm Müller, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 31, 1978, Ser. No. 873,995
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1977, 2707229
Int. Cl.[2] C04B *35/46, 31/02;* C01G *23/00;* C09C *1/04*
U.S. Cl. 106—73.3 **11 Claims**

1. A process for the production of a titanate of at least one member selected from the group consisting of zinc and an alkaline earth metal comprising simultaneously adding a solution of a salt of said member and an alkali solution to a suspension of TiO_2 at a substantially constant pH above about 8, thereby to form a precipitate comprising TiO_2 and the hydroxide of said member, filtering said suspension to recover the solids, and calcining the solids at a temperature above about 500° C. thereby to produce the titanate.

4,173,486
COATING OF GLASS FIBRES

Colin J. Cheetham, Ormskirk, and Phillip Maguire, Liverpool, both of England, assignors to Pilkington Brothers Limited, St. Helens, England

Filed Nov. 8, 1977, Ser. No. 849,578
Claims priority, application United Kingdom, Nov. 11, 1976, 47071/76
Int. Cl.[2] C04B *7/02;* C08J *3/00;* D02G *3/00;* B05D *3/02*
U.S. Cl. 106—99 **22 Claims**

1. A method of coating glass fibres to protect them from deterioration in an alkaline environment, such as a Portland cement matrix, said method comprising the steps of applying to the glass fibres an aqueous composition containing a water-soluble film-forming material having free aliphatic hydroxyl groups in the molecule, a water-soluble ester formed by reaction of a tri-hydroxy- or di-hydroxy-substituted aromatic carboxylic acid with an alcohol having at least two hydroxyl groups in the molecule, and a cross-linking agent, and drying and curing the composition at elevated temperature so as to

cause cross-linking of the hydroxyl groups of the film-forming material, thereby to form a thermoset film coating on the glass fibres which also retains the ester.

16. Glass fibres coated by a method according to claim 1.

18. A cement composite material formed by incorporating coated glass fibres according to claim 16 in a cement matrix.

4,173,487

PROCESS FOR TREATING CEMENT PLANT DUST CATCH

Sidney M. Cohen, Allentown, Pa., assignor to Fuller Company, Catasauqua, Pa.

Continuation-in-part of Ser. No. 512,576, Oct. 7, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,539

Int. Cl.[2] C04B *7/04*

U.S. Cl. 106—103 8 Claims

1. The process of treating the dust catch from a cement manufacturing operation having alkali compounds of up to 6% comprising the steps of:

analyzing the dust catch and determining the cement clinker which would be produced if the dust catch is burned and alkali and sulfur volatilization is achieved;

producing feed material by adding to the dust catch sufficient raw materials to chemically adjust the dust catch to produce cement clinker having the desired analysis when the feed material is burned;

pelletizing the feed material;

burning the feed material in a furnace at reducing conditions at a temperature sufficient to volatilize alkalies and sulfur from the feed material;

discharging cement clinker from the furnace; and

discharging volatilized alkalies from the furnace with the exhaust gases.

4,173,488

OIL-IN-WATER EMULSIONS CONTAINING HYDROPHOLEIC STARCH

Anthony E. Vassiliades, Deerfield; Shrenik Shroff, Lake Forest, and Edward F. Nauman, Chicago, all of Ill., assignors to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 87,654, Nov. 6, 1970, Pat. No. 3,707,514, which is a continuation-in-part of Ser. No. 786,337, Dec. 23, 1968, Pat. No. 3,585,149. This application Oct. 10, 1972, Ser. No. 296,163

Int. Cl.[2] C08L *3/08*

U.S. Cl. 106—213 17 Claims

1. An oil-in-water emulsion coating composition for imparting brightness and/or opacity to paper, boxboard, and the like, said emulsion having a finely dispersed volatile liquid oil phase and a continuous water phase containing a water binder and an emulsifier, wherein the improvement comprises utilizing a combination binder and emulsifier in said water phase consisting essentially of dispersed particles of a hydrophobic benzyl starch containing ether-linked benzyl groups, said dispersed particles being present in a binder-effective concentration at which said particles exhibit the characteristics of forming and stabilizing said emulsion.

4,173,489

ASPHALT MINERAL AGGREGATE COMPOSITIONS

Wheeler C. Crawford, Houston, and James R. wilson, Missouri City, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 12, 1978, Ser. No. 895,699

Int. Cl.[2] C08L *95/00*

U.S. Cl. 106—281 N 4 Claims

1. A surfacing composition comprising:

(a) 100 parts by weight of a mineral aggregate,

(b) about 3 to about 15 parts by weight of an asphalt,

(c) about 1 to about 10 parts by weight of a propoxylated asphalt and wherein the said aggregate is coated with a silane adhesion promoter in an amount such that a residual concentration of the said silane on the aggregate is about 0.001 to about 0.01 weight percent.

4. The surfacing composition of claim 1 wherein the said silane is selected from the group consisting of β-aminoethyl-γ-aminopropyl trimethoxysilane and γ-aminopropyl triethoxysilane.

4,173,490

COATING COMPOSITION

Don H. Rotenberg, Westboro; Patricia M. Cuffe, Dudley; Bernard L. Laurin, Ludlow, and Peter R. Ramirez, Southbridge, all of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Apr. 18, 1978, Ser. No. 897,317

Int. Cl.[2] C09K *3/00*

U.S. Cl. 106—287.14 8 Claims

1. A coating composition which is curable to provide an optically clear abrasion resistant coating, which comprises a product of the hydrolysis of about 40 to 70 weight percent tetraethyl orthosilicate and 60 to 20 weight percent of a silane selected from the group consisting of methyltrimethoxysilane, methyltrietheoxysilane, ethyltrimethoxysilane, ethyltriethoxysilane, dimethyldimethoxysilane, dimethyldiethoxysilane and mixtures thereof and up to 20 weight percent of a siloxane having a reactive polar site.

4,173,491

PIGMENTED MICROPOROUS SILICA MICROSPHERES BY SPRAY PROCESSES

Lloyd Abrams, Hockessin, and Lionel S. Sandell, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 3, 1978, Ser. No. 882,984

Int. Cl.[2] C09C *1/28*

U.S. Cl. 106—288 B 4 Claims

1. A process for preparing pigmented microporous silica microspheres by the steps of

(i) forming an aqueous suspension consisting essentially of particulate inorganic pigment uniformly dispersed in an aqueous solution of an alkali metal silicate,

(ii) spraying the aqueous suspension of step (i) into air to form fine droplets,

(iii) contacting the droplets with a medium consisting essentially of from 0% to 80% by volume of water, based on the volume of the medium, and from 20% to 100% by volume of a water miscible organic liquid, based on the volume of the medium, the pH of the medium being maintained at from 2 to 9 throughout the contacting, to form a suspension of pigmented microporous silica microspheres, and

(iv) isolating the pigmented microporous silica microspheres from the suspension of step (iii).

4,173,492

METHOD OF PREPARING COATED PIGMENT PARTICLES AND THE PRODUCT PRODUCED THEREBY

Edward T. Pollard, 78 Jefferson, Huron, Ohio 44839

Continuation of Ser. No. 668,724, Mar. 19, 1976, abandoned. This application Mar. 22, 1978, Ser. No. 888,946

Int. Cl.[2] C09C *3/08*

U.S. Cl. 106—308 F 7 Claims

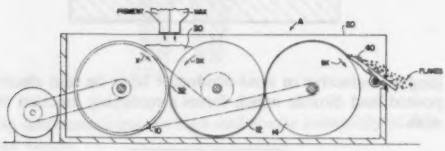
1. A method of preparing colorant flakes comprised of hydrophilic color pigment particles embedded in a wax matrix for dry compounding with a polymeric material, said method comprising the steps of:

(a) providing particles of said color pigment dispersed in a presscake having a given moisture content, said particles having a size ranging from about 0.1 micron to about 100 microns;

(b) before dehydration of said presscake, mixing said particles with particles of a hydroxystearate wax which has a

melting point temperature and is brittle below a selected lower temperature substantially below 212° F. while simultaneously heating the formed admixture to a processing temperature substantially above 212° F., by discharging said pigment particles and wax particles into the nip region of a pair of rotating rolls heated to said processing temperature, to simultaneously boil away any entrapped moisture in said pigment particles and melt the said wax to encapsulate the said pigment particles and form said particle admixture into a molten wax-pigment particle mixture;

(c) passing and compressing said mixture while at said processing temperature between said rolls in the nip thereof



while they are rotated at differing angular velocities to compress and subject said mixture to high shear forces acting to effect further mixing of said pigment particles with and produce substantially uniform dispersion thereof in the said melted wax while simultaneously expelling residual moisture from said pigment particles;

(d) cooling said mixture to a temperature which renders said mixture a brittle, easily breakable solid mass by passing said mixture over and in contact with a surface having a temperature below said selected lower temperature; and,

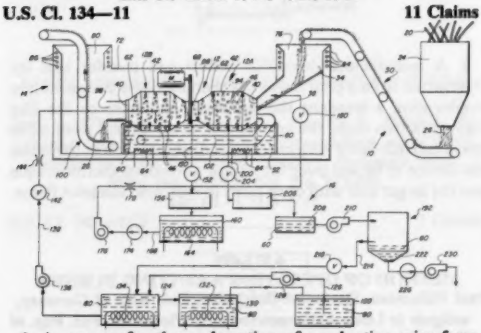
(e) then, scraping said solid mass off said surface to break it into flakes.

4,173,493

RECLAMATION OF CONDUCTIVE WIRE FROM CABLE

William C. Kallas, Park Ridge, Ill., assignor to Lissner Corporation, Chicago, Ill.

Filed Jul. 21, 1977, Ser. No. 817,722
Int. Cl.[2] B08B *5/00, 7/00, 3/00*
U.S. Cl. 134—11 **11 Claims**



1. A process for the reclamation of conductive wire from cable which includes sheathing material and which contains a filler soluble in a heated organic solvent, and for the recovery of the filler and the sheathing,

said process comprising:

mechanically converting the cable into convenient incremental segments to permit flow through a material handling system and to facilitate solvent extraction of said filler from said cable segments,

transporting said segments to and feeding said segments into an extraction system containing an organic solvent in which said filler is soluble,

conveying said segments into and through said solvent contained in a wash station of said system,

mechanically agitating said segments in said solvent in a revolving drum-like extraction vessel of said system in said wash station, said drum-like extraction vessel being formed with a plurality of spaced apertures in a bounding wall thereof to permit entry and exit of said solvent into and from said vessel in extraction of said filler from said segments,

discharging through said apertures of said drum-like vessel a minor fraction of said segments introduced into said extraction vessel, providing conveyor means for receiving the fraction of discharged segments, and redirecting the discharged segments into said extraction vessel,

circulating said solvent in said vessel to extract said segments and to separate said filler therefrom,

discharging said segments from said wash station of said vessel substantially free of said filler,

providing isolating zone means, including solvent vapor condensing means, between said extraction system and the ambient environment to prevent atmospheric air from intermixing with said organic solvent and solvent vapor container in said extraction system,

transporting said segments from said extraction system through said isolating zone means, and

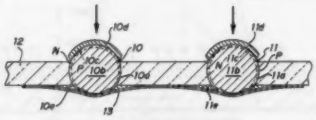
discharging said segments to the ambient environment.

4,173,494

GLASS SUPPORT LIGHT ENERGY CONVERTER

Elwin L. Johnson; Jack S. Kilby, both of Dallas, Tex.; Jay W. Lathrop, Clemson, S.C.; John S. McFerren, Dallas, and David J. Myers, Plano, both of Tex., assignors to Jack S. Kilby, Dallas, Tex.

Filed Feb. 14, 1977, Ser. No. 768,187
Int. Cl.[2] H01L *31/06;* **C25B** *1/02*
U.S. Cl. 136—89 TF **19 Claims**



1. A semiconductor system which comprises in combination:

(a) a multiplicity of semiconducting particles, each having a central body portion inside a surface layer and constituting a photovoltaic generator,

(b) a matrix of glass adhered to each said surface layer to bind said particles in a monolayer sheet form with said particles being exposed at opposite sides of said sheet,

(c) a metal layer on one side of said sheet in contact only with said body portions of said particles and with said sheet, and

(d) transparent metallic electrodes, one covering each surface area of each said particle exposed at the side of said sheet opposite said metallic layer, each said electrode being isolated from every other electrode.

4,173,495

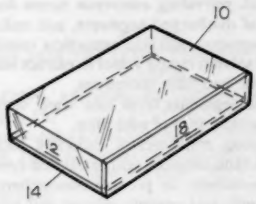
SOLAR COLLECTOR STRUCTURES CONTAINING THIN FILM POLYSILOXANE, AND SOLAR CELLS

Charles F. Rapp, and Norman L. Boling, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed May 3, 1978, Ser. No. 902,520
Int. Cl.[2] H01L *31/04*
U.S. Cl. 136—89 PC **12 Claims**

6. A luminescent solar collector and concentrator comprising a radiation collection medium for receiving incident solar radiation, said medium containing at least one luminescent species capable of emitting luminescent radiation upon excitation with incident solar radiation, said medium being totally internally reflective of a major portion of said emitted luminescent radiation, a relatively small surface area of said medium being optically coupled to a photovoltaic solar cell responsive to said emitted luminescent radiation, wherein said radiation

collection medium is a composite structure comprising a thin layer of a thermoset polysiloxane of a trifunctional silane containing dispersed therein at least one luminescent species, said layer being optically coupled to a thick radiation conducting layer of at least 0.5 mm thickness, which thick layer (1) is



totally internally reflective of a major portion of said emitted luminescent radiation, (2) has an index of refraction close to that of said thin layer, (3) is less absorptive of said emitted luminescent radiation than said thin layer and (4) has a thickness ratio to said thin layer of higher than 4:1.

4,173,496

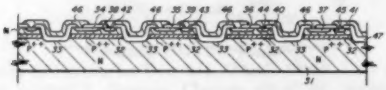
INTEGRATED SOLAR CELL ARRAY

Shang-Yi Chiang, and Bernard G. Carbajal, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 30, 1978, Ser. No. 910,329

Int. Cl.[2] H01L *31/06*

U.S. Cl. 136—89 MS **4 Claims**



1. An integrated solar cell array comprising a semiconductor body having a plurality of n-type regions extending to a surface thereof and isolated from each other by intervening heavily doped p-type regions; a shallow p-type region in each of said n-type regions to form a unit solar cell of said array; said semiconductor surface also including a pattern of grooves which provide lateral isolation between adjacent unit cells, wherein said heavily doped p-type regions extend between said grooves, parallel to said surface at a depth shallower than said grooves, thereby completing the isolation of said adjacent cells; and a conductive film on said surface, patterned to complete the interconnection of said cells in series, whereby the theoretical output voltage of the array is the sum of the voltages of the cells.

4,173,497

AMORPHOUS LEAD DIOXIDE PHOTOVOLTAIC GENERATOR

Ferenc J. Schmidt, Ardmore, and Jacob F. Betz, Quakertown, both of Pa., assignors to Ametek, Inc., Paoli, Pa.

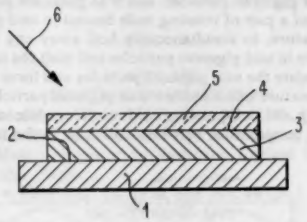
Continuation-in-part of Ser. No. 827,939, Aug. 26, 1977, abandoned. This application Jul. 31, 1978, Ser. No. 929,352

Int. Cl.[2] H01L *31/06*; C25D *5/00*

U.S. Cl. 136—89 SJ **10 Claims**

1. A photovoltaic generator comprising photovoltaic amorphous lead dioxide, having an oxygen to lead ratio in the range 1.66:1 to 1.99:1 interposed between conductive outer layers, through one of which said lead dioxide is exposed to incident light, said lead dioxide having a rectifying junction at its interface with one layer adjacent thereto and an ohmic junction with the other layer adjacent thereto.

6. A method of making a photovoltaic generator comprising electrodepositing amorphous lead dioxide onto a conductive substrate which forms an ohmic junction therewith, and depos-



iting a conductive or semi-conductor layer on said electrodeposited lead dioxide which forms a rectifying junction therewith.

4,173,498

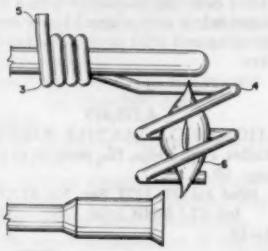
HEAT GATHERING AND CONDUCTING DEVICE FOR THERMOCOUPLE SENSORS

Ray N. Gaines, P.O. Box 311, Crystal Lake, Ill. 60014

Filed Mar. 27, 1978, Ser. No. 890,266

Int. Cl.[2] H01L *35/28*

U.S. Cl. 136—217 **1 Claim**



1. A manufacture device to collect and transfer heat by conduction from a pilot flame to a thermocouple comprising in combination a standard thermocouple and wire or the like formed in two coils, the smaller coil close wound with turns touching each other with an internal diameter such as to permit the device to be slid over the end of a standard thermocouple and the larger coil with open turns to surround the pilot flame.

4,173,499

METHOD OF OPERATING A CUTTING BURNER

Paul Hölemann, Dortmund-Berghofen, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Jul. 18, 1977, Ser. No. 816,690

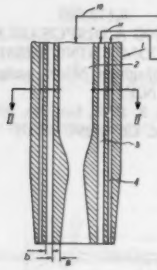
Claims priority, application Fed. Rep. of Germany, Jul. 27, 1976, 2633719

Int. Cl.[2] B23K *7/00, 7/08*

U.S. Cl. 148—9 R **6 Claims**

1. In a method of operating a cutting burner for the autogenous cutting of a metal workpiece, said cutting burner having a nozzle directing an oxygen cutting jet against said workpiece and forming an oxygen curtain around said cutting jet, said cutting jet being formed by passing cutting oxygen through a cutting-jet passage and said curtain being formed by passing oxygen through a passage means, the improvement which comprises proportioning the oxygen flow rates through said cutting-jet passage and said passage means such that the oxygen flow rate through said passage means is 5 to 25% of the

oxygen flow rate through said cutting-jet passage, and directing a heating gas against said burner piece from said nozzle by



passing said heating gas through said nozzle outwardly of said passage means.

4,173,500

PROCESS FOR PRODUCING POROUS CAST IRON

Kenryo Kawaguchi, Yamato, Japan, assignor to Oiles Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1977, Ser. No. 808,564
Claims priority, application Japan, Jun. 25, 1976, 51/74524
Int. Cl.[2] C21D *1/48*
U.S. Cl. 148—16 9 Claims

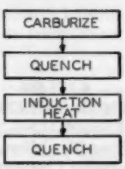
1. A process for producing porous grey cast iron for bearings or the like comprising the step of heating a grey cast iron having mixed structures of perlite and ferrite and a flake graphite structure and consisting of 2.8–4.0 wt% of total carbon, 1.0–3.0 wt% of silicon, less than 1 wt% of elements selected from the group of Mn, P and S and the remainder of iron at a temperature of above A_1 transformation point of the cast iron for 1–5 hours in an atmosphere in which the flake graphite is subjected to oxidation to form pores therein, said atmosphere having the predetermined composition selected among the mixed gases of $CO—CO_2$, $H_2—H_2O$ and $CO—CO_2—H_2—H_2O$.

4,173,501

STEEL TORSIONAL ELEMENT AND METHOD FOR MAKING

Jack A. Hildebrandt, Stevensville; Denver K. Pointer, Buchanan, and Herschel H. Stilley, Edwardsburg, all of Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed Jun. 1, 1978, Ser. No. 911,641
Int. Cl.[2] C21D *1/48*
U.S. Cl. 148—16.5 7 Claims



1. A method for increasing the torsional strength of a steel torsional element, which method comprises the following steps in the sequence set forth:

(a) carburizing the steel torsional element at austenitizing temperatures to a first depth, whereby a carbon enriched case is produced to the first depth;

(b) quenching the torsional element from said austenitizing temperatures with an oil-like quenching medium, whereby a first hardened case to the first depth is produced, and whereby a heat-treat strengthened core is produced;

(c) successively heating longitudinal portions of the torsional element to austenitizing temperatures to a second and greater depth without appreciably affecting the heat-treat strengthed core below the greater depth; and

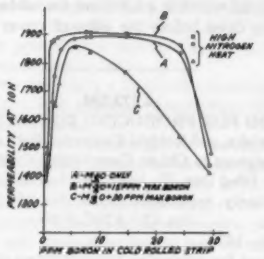
(d) quenching the successively heated longitudinal portions of the torsional element from said austenitizing temperatures with both a water-base quenching medium and the heat-treat strengthened core below the greater depth, whereby the hardness of the first hardened case is a function of both the carbon enriched case and the second recited quenching step, and whereby hardness is produced between the first and second depths of the successively heated longitudinal portions that is both a function of the carbon content of the steel prior to the carburizing step and the second recited quenching step.

4,173,502

METHOD OF PRODUCING SILICON-IRON SHEET MATERIAL WITH BORON ADDITION, AND PRODUCT

Howard C. Fiedler, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 749,117, Dec. 9, 1976, abandoned, which is a continuation-in-part of Ser. No. 677,146, Apr. 15, 1976, abandoned. This application Feb. 27, 1978, Ser. No. 881,541
Int. Cl.[2] H01F *1/04*
U.S. Cl. 148—113 10 Claims



1. The method of producing grain-oriented silicon-iron sheet which comprises the steps of providing a fine-grained, primary-recrystallized, silicon-iron sheet containing 2.2 to 4.5 percent silicon, between about 1.5 and 7.5 parts per million boron, amounts of manganese and sulfur within a ratio of manganese to sulfur less than 2.5, and between about 30 and 90 parts per million nitrogen in the ratio to boron of one to 15 parts per part of boron, covering the sheet with an electrically-insulating adherent coating containing about 15 parts per million boron on the basis of the silicon-iron sheet, the total amount of boron in the sheet and boron in the coating available to the sheet being between about 16.5 and about 22.5 parts per million, and subjecting the coated sheet to a final heat treatment to develop (110) secondary recrystallization texture in the silicon-iron sheet.

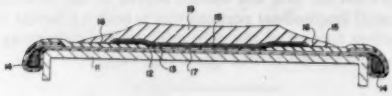
4. An electrically-insulating magnetic sheet material comprising a fine-grained, primary-recrystallized, magnetic, silicon-iron sheet containing 2.2 to 4.5 percent silicon, between about 1.5 and 7.5 parts per million boron, amounts of manganese and sulfur within a ratio of manganese to sulfur less than 2.5, and between about 30 and 90 parts per million nitrogen and having thereon a coating of a water-insoluble hydroxide of a metal selected from the group consisting of calcium, magnesium, manganese and aluminum, said coating containing about 15 parts per million boron on the basis of the silicon-iron sheet and so proportioned to the boron content of the said sheet that the total amount of boron in the sheet and boron in the coating available to the sheet is between about 16.5 and 22.5 parts per million.

4,173,503

METHOD OF MAKING A RADIAL TIRE

James J. Shipman, Akron; Robert W. Hallman, Medina; Linwood P. Tenney, and Leman G. Bezll, Jr., both of Hudson, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed May 30, 1978, Ser. No. 910,803
Int. Cl.[2] B29H *17/14*
U.S. Cl. 156—123 R 15 Claims



1. The method of making in one stage a radial tire for vehicles wherein all the components of the tire including the carcass, belt, and rubber cover material are assembled sequentially upon a cylindrical building drum, with the rubber material forming the sidewall cover of the completed tire having axially spaced portions thereof, overlaid by marginal portions of the belt of the tire; the improvement which comprises coating the said spaced portions of the sidewall cover prior to placement thereof upon the building drum with a composition comprising a thermoplastic, which has a cured interface with the rubber equivalent of the rubber to itself, a solvent for the thermoplastic, and material which is a lubricant for rubber, with the said coating being dried before the sidewall cover is placed upon the carcass.

4,173,504

METHOD FOR PRODUCING TOBACCO FILTERS

Susumu Tomioka, and Kohichi Kunimune, both of Moriyamashi, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Dec. 27, 1977, Ser. No. 864,357
Claims priority, application Japan, Jan. 19, 1977, 52-4757
Int. Cl.[2] A24C *5/50*
U.S. Cl. 156—180 9 Claims

1. A method for producing tobacco filters which comprises forming bundles of fibers consisting of

(I) 20–100% by weight of melt spun composite fibers, and

(II) 80–0% by weight of other fibers,

said composite fibers as set forth in (I)

(A) having a side-by-side or sheath and core arrangement of a first component and a second component,

(1) said first component consisting mainly of crystalline polypropylene or propylene copolymer consisting mainly of propylene,

(2) said second component consisting of a member selected from the group consisting of

(a) an ethylenevinyl acetate copolymer having a vinyl acetate content of 0.5–18 mol% of the total monomers of the vinyl acetate component and the ethylene component,

(b) a saponification product of said ethylene vinyl acetate copolymer set forth in (a) and

(c) a mixed polymer of polyethylene and either (a) or (b), said mixed polymer having a total content of vinyl acetate component and vinyl alcohol component of at least 0.5 mol % based upon the total monomer content of the mixed polymer

(3) said second component having a circumferential ratio of 60–100% of the composite fiber cross section,

(4) the composite weight ratio of the first to the second component being in the range of 30:70–70:30,

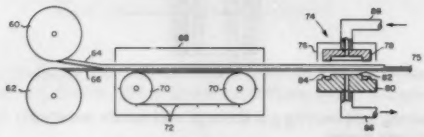
(B) being subjected to heat treatment at a temperature lower than the melting point of the first component and higher than the melting point of said second component to thereby stabilize said fiber bundles by the self adhesion of the second component portions of the composite fibers.

4,173,505

METHOD OF MAKING A DISPOSABLE DENTAL TRAY OR THE LIKE BY COMBINING DISSIMILAR FOAMS

I. Murray Jacobs, Birmingham, Mich., assignor to Sybron Corporation, Rochester, N.Y.

Filed Feb. 3, 1978, Ser. No. 874,850
Int. Cl.[2] B29C *17/03*
U.S. Cl. 156—285 5 Claims



1. A method of making a vacuum formed article having a laminated structure of dissimilar plastic foams comprising the steps of:

(a) superimposing a sheet of closed cell polyethylene foam on a sheet of an open cell hydrophilic polyurethane foam so that said polyethylene foam sheet is supported on and carried by said polyurethane foam sheet;

(b) heating said superimposed sheets by conveying the same through a heating chamber which has been heated to a temperature above the melting point of said polyurethane foam sheet, said sheets being passed through said heating chamber at a rate which allows retention of said sheets in said chamber only for a time sufficient to soften the surfaces of said polyethylene sheet and render the surfaces of said polyurethane sheet tacky, said heating step alone being insufficient to result in the bonding of said sheets so that at the end of said heating step said polyethylene sheet and polyurethane sheet remain unjoined with said polyethylene sheet resting and being carried on said polyurethane sheet;

(c) passing said superimposed sheets from said heating chamber and into a vacuum forming mold; and

(d) establishing a differential pressure across said superimposed sheets in said mold, said polyethylene sheet being oriented between said sheet of hydrophilic polyurethane foam and the higher pressure for moving and compressing said polyethylene sheet towards and against said sheet of hydrophilic polyurethane foam responsive to said differential pressure for simultaneously

bonding said sheets together by embedding the open cell surface of said polyurethane foam sheet in the softened surface of said closed cell polyethylene sheet thereby forming said laminated structure, and

vacuum forming the contours of said article.

4,173,506

BONDING METHOD UTILIZING POLYESTER ADHESIVE EXHIBITING "OPEN TIME"

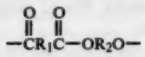
Wayne A. Pletcher, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 699,976, Jun. 25, 1979, Pat. No. 4,059,715, which is a continuation-in-part of Ser. No. 591,935, Jun. 30, 1975, abandoned. This application Aug. 26, 1977, Ser. No. 827,899
Int. Cl.[2] C09J *5/00*
U.S. Cl. 156—309 4 Claims

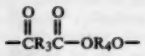
1. A method for forming a strong bond between a substrate and a thermoplastic copolyester comprising

(1) melting a thermoplastic segmented copolyester having an open time of at least about ¼ minute at 20° C. and consisting essentially of from about 5 to 75 percent by weight of amorphous ester units and 95 to 25 percent by weight of

crystallizable ester units joined through ester linkages, the crystallizable ester units being or the formula



and the amorphous ester units being of the formula



wherein R_1 consists of residues of one or more diacids selected from saturated aliphatic dicarboxylic acids containing from 4 to 10 carbon atoms and aromatic dicarboxylic acids selected from terephthalic acid, isophthalic acid, phthalic acid, 4,4'-benzophenone dicarboxylic acid, 4,4'-diphenylmethane dicarboxylic acid, 4,4'-diphenylether dicarboxylic acid, 4,4'-diphenylthioether dicarboxylic acid and 4,4'-diphenylamine dicarboxylic acid, R_2 consists of residues of one or more saturated aliphatic diols containing from 2 to 12 carbon atoms, R_3 is R_1 or R_5, R_4 is R_2 or R_6, R_5 consists of the divalent radicals containing from about 22 to 50 carbon atoms which remain after removal of the carboxyl groups from saturated aliphatic dimer acids and R_6 consists of the divalent radicals remaining after removal of the hydroxyl groups of long chain aliphatic diols having an average molecular weight of 200 to 4000, provided that at least one of R_3 and R_4 is each amorphous ester unit is R_5 or R_6, and provided that when R_1 is aromatic, R_2 contains from 6 to 12 carbon atoms and the amorphous content is 50–75 percent by weight, the said copolyester having a DTA melting temperature of from about 25° to 150° C., an inherent viscosity of at least 0.5 dl/g at 25° C., as measured in 0.3 g/dl solutions of polymer in chloroform at 25° C., substantially complete solubility in toluene at 25° C. in the ratio of about 10 percent by weight of copolyester and 90% by weight of solvent, a tensile strength of 100–400 kg/cm^2, an elongation at break of 400–1000 percent, a T-peel adhesion to vinyl of at least 0.9 kg/cm of width and a DTA glass transition temperature, T_g, below −25° C.,

(2) cooling the copolyester below its melting temperature,

(3) bringing the copolyester into contact with the substrate which is at a temperature below the copolyester melting temperature and while the copolyester is still open, and

(4) maintaining the copolyester and the substrate in contact until the copolyester has reverted to its solid, non-bondable state.

2. A method according to claim 1 for forming a strong, dependable adhesive bond between substrate surfaces without subjecting the substrates to high temperature and without the involvement of volatiles which comprises:

(1) melting a thermoplastic segmented copolyester having an open time of at least about ½ minute at 20° C., a tensile strength of 100–400 kg/cm^2, an elongation at break of 400–1000 percent, a T-peel adhesion to vinyl of at least 0.9 kg/cm of width and a DTA glass transition temperature, T_g, below −25° C.,

(2) cooling the copolyester below its melting temperature,

(3) forming an assembly comprising a bonding layer of the copolyester which is still open between the substrate surfaces which are below the melting temperature of the copolyester, and

(4) maintaining the assembly at a temperature below the melting temperature of the copolyester until it has reverted to its normal, solid, non-bondable state.

4,173,507

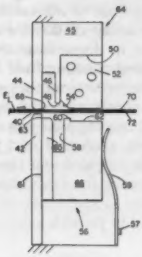
SEPARATING LAMINATED LAYERS

Frederic S. Tobey, Brewster, Mass., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Nov. 15, 1977, Ser. No. 851,685

Int. Cl.[2] **B31F** *1/00;* **B32B** *31/00*

U.S. Cl. 156—443 **7 Claims**



1. Apparatus for separating layers of a laminate at an end thereof, comprising means for bending said layers sharply in one direction at one portion of said end, and bending said layers in the opposite direction at a lengthwise adjacent portion of said end, to cause shearing and lengthwise offset between said layers, and then releasing said end, a differential in the forces that tend to straighten the layers causing said layers to separate upon their release from said means, said means comprising

a first portion providing a narrow cavity and a support surface adjacent thereto, and

a second portion providing a finger-like member, narrower than said cavity, and, adjacent to said finger-like member, a compressible member,

one of said portions being mounted for movement toward the other with an end portion of said laminate therebetween, to cause said finger-like member to force said end portion of said laminate into said cavity while said compressible member holds an adjacent portion of said laminate against said support surface to restrain said laminate longitudinally.

4,173,508

APPARATUS FOR HANDLING GLASS JARS

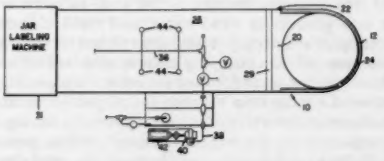
Robert B. Lind, Oakland, Calif., assignor to Gerber Products Company, Fremont, Mich.

Continuation of Ser. No. 589,159, Jun. 23, 1975, Pat. No. 4,077,826, which is a continuation of Ser. No. 166,885, Jul. 28, 1971, abandoned. This application Jan. 30, 1978, Ser. No. 873,756

The portion of the term of this patent subsequent to Mar. 7, 1995, has been disclaimed.

Int. Cl.[2] **B65C** *3/06;* **B32B** *17/06;* **B65B** *21/04*

U.S. Cl. 156—499 **1 Claim**



1. In an apparatus for processing externally soiled, cooled, filled glass jars of the type having a closure cap, said jars having been stored during cooling in stacked layers, the apparatus including an unloading station, a jar labeling station, a conveyor belt extending between the unloading station and the labeling station, means for moving said conveyor belt at a

predetermined speed; means located at the unloading station for transferring successive layers of said jars to said conveyor belt so as to provide a continuous supply of said jars thereto; means located at said jar labeling station for applying labels to the surface of said jars, the improvement comprising:

a jar heating and cleaning station positioned along the path of said conveyor belt closely adjacent said jar labeling station, said heating and cleaning station including means to heat a cleaning fluid to substantially 200° F., a quantity of said fluid, an array of downwardly projecting spray nozzles operative to disperse an overlapping continuous spray of said heated cleaning fluid onto said caps and jars during continuous movement thereof along said conveyor belt for simultaneously cleaning the surfaces of said caps and said jars and heating said jars substantially above the room temperature, such that said jar labeling station receives said jars in a heated and cleaned state for securing labels thereto, means for circulating cleaning fluid from said heating means to said spray nozzles, and sufficient of said cleaning fluid to provide said continuous overlapping spray.

4,173,509

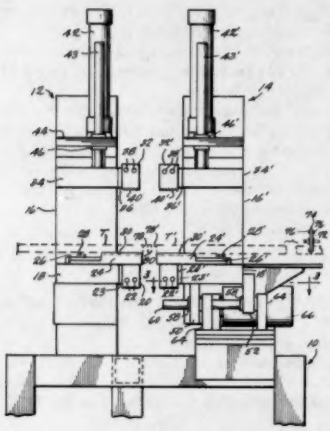
APPARATUS FOR SPLICING TREAD STRIPS

Ralph C. Raabe, Letts; Roger G. Cleffman, and Raymond G. Stratton, both of Muscatine, all of Iowa, assignors to Bandag Incorporated, Muscatine, Iowa

Division of Ser. No. 649,518, Jan. 15, 1976, Pat. No. 4,082,592. This application Jan. 18, 1978, Ser. No. 870,584

Int. Cl.[2] B29C *27/06*

U.S. Cl. 156—507 **8 Claims**



1. Apparatus for splicing the ends of two precured rubber tread strips having tread grooves in one surface thereof, said apparatus comprising: two mold elements each of which has a ribbed surface complementary to the grooved surface of the tread strip whereby the ribs on the mold elements are insertable into grooves in tread strips, said mold elements being spaced apart and arranged with their ribbed surfaces generally in the same plane; a clamping element mounted adjacent each mold element so as to form an assembly for clamping the end portion of a tread strip between the respective mold element and clamping element, each clamping element having a clamping surface facing the respective ribbed surface; power means for effecting relative movement between the mold element and clamping element of each assembly toward and away from each other while maintaining the mold elements coplanar; power means for effecting relative movement between the assemblies toward and away from each other in the plane of the ribbed surfaces of the mold elements to thereby abut the ends of two tread strips clamped between the elements of the assemblies; and means for heating at least one element of each assembly in order to heat the end portions of the clamped tread strips when the latter are abutted with each other.

4,173,510

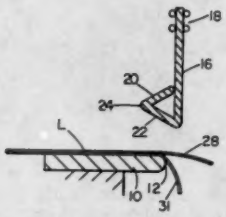
APPARATUS FOR SEPARATING LAMINATED LAYERS

Frederic S. Tobey, Brewster, Mass., assignor to W. H. Brady Co., Milwaukee, Wis.

Filed Nov. 10, 1977, Ser. No. 850,266

Int. Cl.[2] B32B *35/00, 7/12*

U.S. Cl. 156—584 **6 Claims**



1. Apparatus for separating layers of a laminate at an end thereof at which said layers are coterminous, comprising

means for supporting said laminate to permit bending thereof at said end, and

means for applying a force against the outer surface of one said layer and pressing said one layer against the other said layer to simultaneously bend both said layers at said end sufficiently sharply to cause shearing and lengthwise offset therebetween, said outer surface being on the outside of said bend, and for thereafter releasing both said layers to permit them to spring back from said bending said means for supporting comprising a support having a sharply rounded edge, and said means for applying a force comprising a member for wiping around said edge an end of said laminate held on said support.

4,173,511

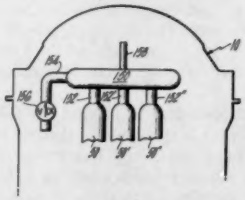
CONTROL ROD BLOW OUT PROTECTION SYSTEM

Joseph R. Dietrich, West Hartford; William S. Flinn, Bloomfield, and Malcolm D. Groves, Simsbury, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Jul. 10, 1972, Ser. No. 270,319

Int. Cl.[2] G21C *7/12*

U.S. Cl. 176—36 R **4 Claims**



1. In a nuclear reactor, the reactor including a vessel for containing a circulating coolant under pressure and having a fuel assembly disposed therein, the fuel assembly comprising a plurality of fuel elements containing fissionable material and a plurality of guide tubes for movable neutron absorber elements, an improved control system comprising:

first tubular extension means for each of the guide tubes, said first guide tube extension means extending upwardly from the fuel assembly and having open upper ends terminating within the reactor vessel;

first conduit means coupling the lower ends of said first extension means to the upper ends of associated guide

tubes, said first conduit means and extension means cooperating with the guide tubes to define hydraulic cylinders which extend above the fuel assembly;

neutron absorber element means disposed for movement in said hydraulic cylinders, each of said absorber element means in part defining a lift piston which cooperates with its associated hydraulic cylinder;

a source of coolant at a lift pressure exceeding the coolant pressure normally maintained within the reactor vessel, said lift pressure source being located exteriorly of the reactor vessel;

second conduit means for selectively and individually coupling the lower ends of the guide tubes to said lift pressure source whereby selected of said absorber element means may be raised by application of lift pressure to the lower ends of said hydraulic cylinders, said second conduit means penetrating the reactor vessel; and

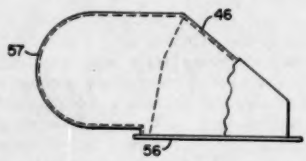
passive means connected to the upper ends of said first tubular extension means, said first tubular extension means being associated together in groups comprising less than the total number of guide tubes, each of said groups being associated with a respective of said passive means, said passive means establishing fluid communication between all of the guide tube extension means of each group and the interior of the reactor vessel, said passive means limiting coolant flow through said hydraulic cylinders to a rate commensurate with raising individual of the absorber element means of each group of guide tubes, said passive means thereby preventing simultaneous raising of a plurality of absorber element means upon establishment of a pressure less than normal coolant pressure within the reactor vessel.

4,173,512

SHOCK ABSORBER SYSTEM FOR NUCLEAR REACTOR ICE CONDENSER COMPARTMENT

Joseph F. Meier, Export; George E. Rudd, Murrysville, both of Pa.; Ashok V. Pradhan, Beechwood, Ohio; John A. George, Greensburg, Pa.; Hugh W. Lippincott, Pittsburgh, Pa., and John D. Sutherland, Monroeville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 9, 1974, Ser. No. 459,450
Int. Cl.[2] G21C *13/10*
U.S. Cl. 176—37 **6 Claims**



1. A shock absorber system for use in an ice condenser compartment for a nuclear reactor comprising:

a containment enclosing a reactor compartment containing a nuclear reactor having a closed cooling system including piping connecting the reactor, pumps and a steam generator in a closed loop;

a wall in the reactor compartment spaced from the inner surface of the containment, the space therebetween defining an ice condenser compartment;

multiple aligned ports located in the bottom of said wall, movable doors mounted in each of said ports, said ports providing access from the reactor compartment to the ice condenser compartment so that in the event of rupture of said piping, coolant released inside the reactor compartment generates a steam pressure which forces said doors under high velocity to an open position thereby providing an avenue for escape of steam into the ice condenser compartment;

separate crushable shock absorbing means mounted inside the condenser compartment adjacent said ports for absorbing the energy imparted to each door by the steam pressure;

each of said shock absorber means comprising a member approximately the same size as each of said doors and containing material displaying rigid-brittle type crush behavior which permits fragmentation upon being impacted by said door, and being capable of absorbing the impacting forces of the door without the door rebounding to a closed position; and

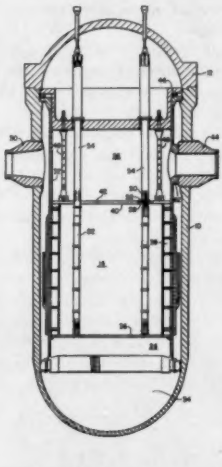
means covering said material for containing the fragmented particles after being impacted by said door, said covering means comprising a fabric containment bag which encompasses said shock absorber material and having an amount of excess fabric of a size sufficiently large to accept at least a major portion of the fragmented material after impacting and to minimize the establishment of an air pressure inside the bag at the time of crushing the fragmented material.

4,173,513

NUCLEAR REACTOR WITH CONTROL RODS

Franklin D. Obermeyer, Pensacola, and Robert T. Berringer, Gulf Breeze, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 7, 1977, Ser. No. 813,564
Int. Cl.[2] G21C *15/00*
U.S. Cl. 176—50 **3 Claims**



1. A nuclear reactor including a pressure vessel, fuel assemblies mounted within said vessel between a perforated lower core plate and a perforated upper core plate, an upper support spaced above said upper core plate, means for circulating a liquid coolant through said vessel and fuel assemblies including a vessel outlet nozzle disposed at an elevation between the elevations of said upper core plate and upper support, a support column mounted to said upper core plate and said upper support in vertical alignment with one of said fuel assemblies, a control rod guide tube mounted between said upper core plate and said upper support plate in vertical alignment with another one of said fuel assemblies for slidingly receiving a rectilinearly movable control rod and being sized to receive a substantial portion of said coolant exiting said another fuel assembly, said guide tube having a plurality of perforated horizontal supports affixed substantially within said guide tube at preselected spaced elevations along said guide tube and a perforated bottom support affixed to the bottom of said guide tube, a plurality of primary flow openings in the wall of said guide tube between said bottom support and the lowermost of said horizontal supports, said guide tube being impervious to

substantial radial discharge of coolant except for discharge through said primary openings, and a continuous control rod guide extending and affixed between said bottom support and said lowermost horizontal support, said lowermost support being positioned at an elevation below the elevation of the flow area of said outlet nozzle.

4,173,514

HIGH MANNITOL PROCESS (ENZYMATIC ISOMERIZATION)

Walter M. Kruse, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.

Filed Jun. 2, 1977, Ser. No. 802,653
Int. Cl.[2] C12D *13/02*
U.S. Cl. 435—94 **11 Claims**

1. A process for obtaining a mannitol-rich solution of sorbitol and mannitol from glucose which comprises:

(a) catalytically epimerizing glucose in an acidic aqueous solution in the presence of a hexa- valent molybdenum catalyst at a temperature not exceeding about 100° C., thereby obtaining a mixture of glucose and mannose in aqueous solution;

(b) contacting said mixture of glucose and mannose in aqueous solution with a glucose isomerase enzyme under enzymatic isomerization conditions, whereby a portion of the glucose content of said mixture is isomerized and a mixture of glucose, fructose, and mannose in aqueous solution is formed; and

(c) catalytically hydrogenating said mixture of glucose, fructose, and mannose in aqueous solution, thereby forming an aqueous solution containing sorbitol and mannitol.

10. A process for obtaining a mixture of glucose, fructose, and mannose in aqueous solution which comprises:

(a) catalytically epimerizing glucose in an acidic aqueous solution in the presence of a hexavalent molybdenum catalyst at a temperature not exceeding about 100° C., thereby obtaining a mixture of glucose and mannose in aqueous solution; and

(b) contacting said mixture of glucose and mannose in aqueous solution with a glucose isomerase enzyme under enzymatic isomerization conditions, whereby a portion of the glucose content but no substantial portion of the mannose content of said mixture is isomerized and a mixture of glucose, fructose, and mannose in aqueous solution is formed.

4,173,515

GROUP D ENTEROCOCCI BROTH

Clifton Aldridge, Crawford County; Sandra F. Gibson, Chesterfield, both of Mo.; Richard D. Vannest, Richardson, Tex., and Gregory D. Rodgers, Florissant, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 682,661, May 3, 1976, abandoned. This application May 2, 1977, Ser. No. 792,715
Int. Cl.[2] C12K *1/10*
U.S. Cl. 435—38 **9 Claims**

1. A broth medium for the detection of Group D enterococci in polymicrobic specimen comprising:

(a) a nitrogen source,

(b) a carbon source,

(c) an antibiotic inhibitor to inhibit growth of *Staphylococcus aureus*,

(d) an inhibitor to inhibit growth of gram-negative organisms, and

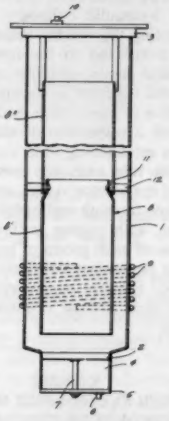
(e) an indicator system which comprises ferric ammonium citrate and esculin hydrolysate whereby metabolic activity of Group D enterococci forms a precipitate in the medium.

4,173,516

DEVICE FOR CULTIVATING CELLS OF ANIMAL AND HUMAN TISSUES

Hermann Katinger, Vienna, and Winfried Scheirer, Wiener-Neudorf, both of Austria, assignors to Chemap AG, Maennedorf, Switzerland

Division of Ser. No. 814,415, Jul. 11, 1977, abandoned. This application Oct. 6, 1977, Ser. No. 840,165
Claims priority, application Austria, Jul. 15, 1976, 5213/76
Int. Cl.[2] C12B *1/14*
U.S. Cl. 435—286 **1 Claim**



1. An arrangement for cultivating cells of animal and human tissues which are highly susceptible to damage resulting from agitation, comprising an upright container for nutrient solution containing the cells which tend to settle in the solution; guide means located in said container and subdividing the interior of the latter into two zones; means for accommodating an oxygen-containing gas and including a gas chamber located below said container; and means for introducing said oxygen-containing gas from said gas chamber of said accommodating means into said container, and including a plate separating said chamber from said container and having at least one outlet opening communicating with said interior and through which said oxygen-containing gas is introduced into said container so as to impart to said nutrient solution a circulatory movement between said zones which is sufficient to prevent the cells from settling and maintain them in suspended state, but is so slight as to avoid agitating said nutrient solution with concomitant damage to the cells, said introducing means constituting the only means for imparting circulatory movement to said nutrient solution, said container having side walls, and said guide means being a tubular member located within said container and inwardly spaced from said side walls thereof, so as to form an inner hollow inside said tubular member defining one of said zones and an outer hollow between said tubular member and the walls of said container defining the other of said zones, for circulating said nutrient solution therethrough, said tubular member being elongated in a substantially vertical direction and having at least two portions which are spaced from each other in the direction of elongation thereof and define therebetween a further outlet opening so that said nutrient solution circulates between said inner and said outer hollow through said further opening.

4,173,517
ELECTROCHEMICAL PROCESS FOR DICYCLOPENTADIENYL IRON

Herbert Lehmkuhl, and Wilhelm Eisenbach, both of Mülheim an der Ruhr, Fed. Rep. of Germany, assignors to Studiengesellschaft Kohle mbH, Mulheim an der Ruhr, Fed. Rep. of Germany

Filed May 1, 1978, Ser. No. 901,918

Claims priority, application Fed. Rep. of Germany, May 5, 1977, 2720165

Int. Cl.[2] C25D *3/12*

U.S. Cl. 204—59 QM **11 Claims**

1. A process for the direct production of ferrocenes from iron and cyclopentadiene or derivatives of cyclopentadiene, comprising electrolyzing a conductive salt-containing solution of a monomeric cyclopentadiene compound in an inert solvent, between an iron anode and a cathode which is inert toward the electrolyte.

4,173,518
ELECTRODES FOR ALUMINUM REDUCTION CELLS

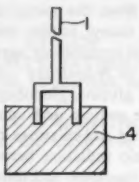
Koichi Yamada; Tadanori Hashimoto, and Kazuo Horinouchi, all of Niihama, Japan, assignors to Sumitomo Aluminum Smelting Company, Limited, Osaka, Japan

Continuation of Ser. No. 624,004, Oct. 20, 1975, abandoned. This application Oct. 25, 1977, Ser. No. 845,287

Claims priority, application Japan, Oct. 23, 1974, 49-122916; May 7, 1975, 50-55015

Int. Cl.[2] C25C *3/06, 7/02*; C25B *11/04*

U.S. Cl. 204—67 **26 Claims**



1. A method for producing aluminum by the molten salt electrolysis of aluminum oxide which comprises electrolyzing aluminum oxide dissolved in a molten salt containing aluminum sodium fluoride as the main component at a temperature of about 900° C. to about 1000° C. by passing a direct current therefor through an anode to a cathode disposed in said molten salt, wherein at least a portion of said anode that is brought into contact with said molten salt is made of or covered with a composition which includes at least about 50% by weight of electronic conductive oxide ceramics selected from one or a combination of oxides represented by general formulae XYO_2 wherein X is a monovalent metal, Y is a trivalent metal and O is an oxygen atom; $D_2E_2O_7$ wherein D is a trivalent metal, E is a tetravalent metal and O is an oxygen atom; and GRO_4 wherein G is a trivalent or tetravalent metal, R is a pentavalent or tetravalent metal and O is oxygen atom, with the proviso that when G is a trivalent metal then R is selected from pentavalent metals, and when G is a tetravalent metal then R is selected from tetravalent metals.

4,173,519
METHOD, PROCESS, SYSTEM, AND APPARATUS FOR RECOVERING METAL VALUES FROM ORES

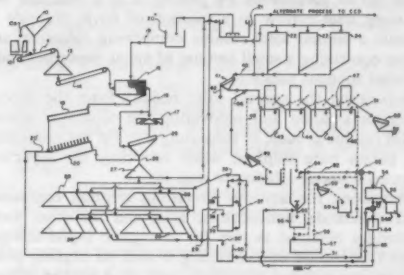
Trent J. Parker, 1880 Laurel Hurst Dr., Salt Lake City, Utah 84108, and Harmel A. Dawson, 1043 Barbara Pl., Salt Lake City, Utah 84102

Filed Nov. 7, 1978, Ser. No. 958,539

Int. Cl.[2] C25C *1/20, 7/00*

U.S. Cl. 204—110 **13 Claims**

1. A method of recovering metal values from mined ore, comprising the steps of: providing a quantity of said ore; separating from said ore quantity a majority of the slime material therein; processing the so-separated slime material in slime soak-leach tanks to recover metal values therefrom; separately processing a remainder of said ore quantity, from which said



majority has been removed, in heap-leach piles to derive a pregnant liquor; and processing said pregnant liquor to derive metal values therefrom.

4,173,520
HYDROMETALLURGICAL METHOD FOR TREATING NICKEL MATTES

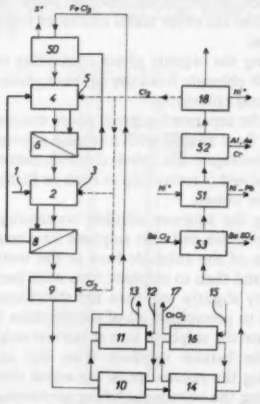
Jean-Michel Demarthe, Viroflay; Louis Gandon, Rambouillet, and Monique Goujet, Versailles, all of France, assignors to Societe Metallurgique le Nickel-S.L.N., Paris, France

Continuation of Ser. No. 649,744, Jan. 16, 1976, abandoned. This application Nov. 8, 1977, Ser. No. 849,603

Claims priority, application France, Jan. 16, 1975, 75 01264; Dec. 12, 1975, 75 38166

Int. Cl.[2] C25C *1/06*

U.S. Cl. 204—113 **14 Claims**



1. A hydrometallurgical process of treating nickel matte containing nickel, cobalt, iron, and sulphur values and trace amounts of lead, chromium, arsenic, and aluminum values to recover essentially pure nickel, comprising:

(a) subjecting an aqueous mixture containing the matte in a grain size of between 100 and 2,000 microns and a concentration of about from 5 to 100 grams per liter of the sum of ferrous and ferric ions to the action of gaseous chlorine to obtain a first solid residue and an aqueous lixiviating solution having a pH value of substantially nil or positive and containing ferric chloride in a concentration of about from 5 to 100 grams per liter, hydrochloric acid, and the chlorides of the metals in the matte;

(b) separating the first solid residue from the aqueous lixiviating solution which has a concentration of nickel of at least 100 g/l and subjecting the aqueous lixiviating solu-

tion to the action of chlorine so as to oxidize all ferrous ions therein to ferric;

(c) subjecting the separated first solid residue obtained in step (b) to percolation by placing it in a fluidized bed moving counterflow to a solution of ferric chloride to obtain a second solid residue comprising elemental sulphur containing a small amount of metal impurities and a second aqueous solution;

(d) separating the second solid residue from the second aqueous solution and recovering the separated second solid residue as such, or subjecting it to further processing to obtain pure sulphur, while recycling the separated second aqueous solution to step (a);

(e) subjecting the aqueous lixiviating solution containing ferric chloride, hydrochloric acid, and the other metal chlorides obtained in step (b) to organic liquid-aqueous liquid extraction by contacting it with an organic phase containing tributyl phosphate and an aromatic diluent whereupon all the ferric chloride and hydrochloric acid pass into the organic phase while the other metal chlorides remain in the aqueous phase;

(f) separating the organic phase containing all the ferric chloride and hydrochloric acid from the aqueous phase containing all the other metal chlorides;

(g) eluting the separated organic phase containing the ferric chloride and hydrochloric acid from step (f) with a first aqueous regeneration phase whereupon all of the ferric chloride and hydrochloric acid pass into the aqueous phase which is recycled to the percolation procedure of step (c) and thereafter recycled to step (a);

(h) subjecting the separated aqueous phase containing the other metal chlorides obtained in step (f) and now free of ferric chloride to organic liquid-aqueous liquid extraction by contacting it with an organic phase containing triisooctylamine, an aromatic diluent, and tributyl phosphate whereupon all the cobalt chloride passes into the organic phase while the other metal chlorides remain in the aqueous phase;

(i) separating the organic phase containing essentially all of the cobalt chloride from the aqueous phase containing the other metal chlorides;

(j) eluting the separated organic phase containing the cobalt chloride from step (i) with a second aqueous regeneration phase whereupon the cobalt chloride passes into the aqueous phase and is recovered as such or further processed to obtain the cobalt;

(k) treating the aqueous solution containing the remaining metal chlorides and also sulphate ions resulting from the oxidation of the sulphide ions in the matte to elemental sulphur and then to sulphate ions with barium chloride in a quantity slightly less than the stoichiometrical amount required to precipitate all of the sulphate ions, thereby to precipitate the sulphate ions as barium sulphate, and separating the barium sulphate from the aqueous solution containing the remainder of the metal chlorides;

(l) subjecting the aqueous solution containing the remaining metal chlorides from step (k) to partial electrolysis employing a soluble nickel anode to obtain a deposit of lead on nickel and an aqueous phase containing the remaining metal chlorides;

(m) separating the nickel-lead deposit from the aqueous phase containing the remainder of the metal chlorides;

(n) subjecting the separated aqueous phase containing the remaining metal chlorides obtained in step (m) to organic liquid-aqueous liquid extraction by contacting it with an organic phase containing at least one di-ester of orthophosphoric acid and an aromatic diluent whereupon the chlorides of chromium, aluminum, and arsenic pass into the organic phase while the nickel chloride remains in the aqueous phase;

(o) separating the organic phase containing the chromium, aluminum, and arsenic chlorides from the aqueous phase containing nickel chloride only;

(p) treating the separated organic phase from step (o) to recover the chromium, aluminum, and arsenic chlorides; and

(q) electrolyzing the separated aqueous nickel chloride solution from step (o) to obtain pure nickel at the cathode and recycling the chlorine gas produced to step (a).

4,173,521

PHOTOSENSITIVE REDOX SOLUTIONS

Robert C. Wade, Ipswich, Mass., assignor to Thiokol Corporation, Newtown, Pa.

Continuation-in-part of Ser. No. 842,716, Jul. 17, 1969, abandoned. This application Nov. 8, 1971, Ser. No. 196,804

Int. Cl.[2] B01J *1/10, 31/12*

U.S. Cl. 204—157.1 R **6 Claims**

1. The method for reducing a compound normally reducible with Ti (III) which comprises contacting the compound to be reduced in a confined reaction zone free of oxygen with an aqueous solution having a pH between about 2 and about 10 and containing (1) from about 0.1 to 3 weight percent of a titanium (IV) compound and (2) from about 0.5 to 3 weight percent of a complexing agent, the weight percent of said complexing agent being at least equal to that of said titanium (IV) compound, said titanium (IV) compound being selected from the group consisting of (a) the reaction product of substantially anhydrous trimethyl borate with substantially anhydrous titanium tetrachloride, (b) a water soluble titanium compound conforming substantially to the formula $CL_2Ti(OR)_2$ where R is selected from the group consisting of H, CH_3, C_3H_7 and C_4H_9, (c) titanyl sulfate solutions and (d) titanyl chloride solutions, said complexing agent being selected from the group consisting of N-hydroxy - ethylene - diaminetri - acetic acid, diethanol glycine, glucoheptanoic acid, succharic acid, mucid acid, the sodium and ammonium salts of these acids, polyvinyl alcohol and mixtures thereof, and subjecting said solution to actinic radiation between the lower wavelengths of the visible spectrum and ultraviolet light.

4,173,522

METHOD AND APPARATUS FOR PRODUCING CARBON COATINGS BY SPUTTERING

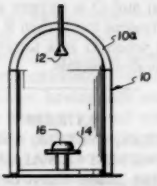
Hans K. Pulker, Triesen, Liechtenstein, and Reinhard Staffler, Feldkirch, Austria, assignors to Balzers Patent- und Beteiligungs-Aktiengesellschaft, Liechtenstein

Filed Sep. 7, 1977, Ser. No. 831,132

Claims priority, application Switzerland, Sep. 9, 1976, 011424/76

Int. Cl.[2] C23C *15/00*

U.S. Cl. 204—192 C **1 Claim**



1. A method of forming a carbon coating on a substrate comprising placing a fibrous carbon material having a density of less than 2 grams per cubic centimeter on an electrode forming a cathode which is spaced away from an electrode forming an anode and energizing the electrodes to deposit the carbon material on the substrate by sputtering.

4,173,523

CATHODIC PROTECTION OF A STRUCTURE IN THE SEA BY SACRIFICIAL ANODES

Joël Bastien, Toulouse; Jaime Gratacos, Morlaas, and Flavien Lazarre, Pau, all of France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France

Filed Sep. 12, 1977, Ser. No. 832,472
Claims priority, application France, Sep. 13, 1976, 76 27443
Int. Cl.[2] C23F *13/00*
U.S. Cl. 204—197 4 Claims

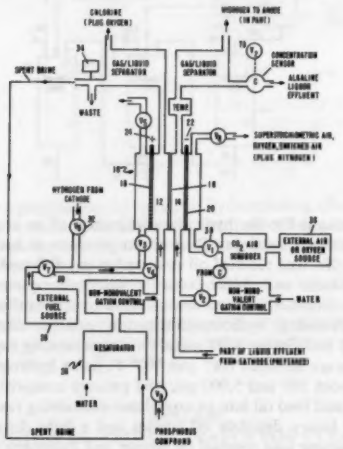
1. A system for cathodic protection of a metal structure in the sea, by means of submerged sacrificial anodes which are joined by electrical conductors to the metal structure, comprising at least one sacrificial anode of a first composition for which the current output is greater than 10 Amperes per square meter with potentials on the order of −900 millivolts in relation to a standard saturated calomel electrode, and at least one sacrificial anode of a second composition different from the first for which the currentoutput is less than 6 Amperes per square meter for potentials on the order of −900 millivolts in relation to an electrode of saturated calomel, and wherein the anodes of the first and of the second composition are aluminum anodes with 0.3 to 6% zinc or cadmium, and 0.02 to 0.2% of mercury, the anodes of the first composition containing less than 0.005% of magnesium and less than 0.005% of copper, the anodes of the second composition containing 0.5 to 10% of magnesium and 0.1 to 1.0% of copper, the absolute values of the decomposition potential under load from the anodes of the first and of the second composition being greater than the absolute value of the potential of the structure to be protected.

4,173,524

CHLOR-ALKALI ELECTROLYSIS CELL

Wayne A. McRae, Zurich, Switzerland, assignor to Ionics Inc., Watertown, Mass.

Filed Sep. 14, 1978, Ser. No. 942,109
Int. Cl.[2] C25B *9/00*
U.S. Cl. 204—265 9 Claims



1. In a chlor-alkali cell comprising an anode compartment containing an anode, a cathode compartment containing a cathode catalytic for the reduction of oxygen, a substantially fluid impervious cation permselective membrane separating said anode and cathode compartments, means for passing a direct electric current between said cathode and said anode, the improvement which comprises:

(a) means for flowing a substantially saturated aqueous chloride solution into said anode compartment;

(b) means for resaturating and recirculating to said anode compartment part of the liquid effluent from said compartment;

(c) means for maintaining the concentration of any non-monovalent metallic cation in the feed to said anode compartment at a concentration of not more than about 5 parts per million;

(d) means for maintaining in the feed to said anode compartment substantially more than 1 part per million of a phosphorous containing compound which can form gelatinous calcium phosphate in the presence of calcium ions under the environmental conditions existing in the anode compartment;

(e) means for maintaining the pH of the liquid effluent from said anode compartment in the range of from about 2 to about 4;

(f) means for passing into contact with said cathode substantially more than the stoichiometric amount of a substantially carbon-dioxide free gas selected from the group consisting of oxygen, air and mixtures thereof;

(g) means for maintaining the liquid effluent from said cathode compartment at a concentration of at least 8 percent by weight;

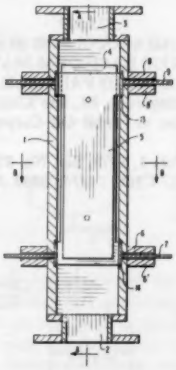
(h) means for maintaining the liquid immediately effluent from said cathode compartment at a temperature of at least 70° C.

4,173,525

ELECTROLYTIC CELL FOR ELECTROLYSIS OF SEA WATER

Shuji Nakamatsu, Ichihara; Hiroyuki Harada, Yokohama; Yoshitugu Shinomiya, Tamano, and Tuyoshi Omizu, Okayama, all of Japan, assignors to Chlorine Engineers Corp., Ltd., Tokyo, Japan

Filed Jul. 21, 1978, Ser. No. 926,775
Int. Cl.[2] C25B *9/00, 1/26, 11/02*
U.S. Cl. 204—275 5 Claims



1. An electrolytic cell for electrolysis of sea water comprising

a housing having an opening at the bottom and top of the housing for in-flow of sea water and out-flow of electrolyzed sea water, respectively;

a plurality of flat plate-like anodes vertically disposed in the housing with the major surface area of the anodes being parallel to the flow of sea water through the cell;

a plurality of flat plate-like cathodes vertically disposed in the housing with the major surface area of the cathodes being parallel to the flow of sea water through the cell;

an outwardly projecting portion for passing an electric current provided at the lower side edge of each of the anodes;

an outwardly projecting portion for passing an electric

current provided at the upper side edge of each of the cathodes;

an electric current-passing plate secured to the lower portion of the housing and connected to the portions for passing an electric current to each of the anodes; and

an electric current-passing plate secured to the upper portion of the housing and connected to the portions for passing an electric current to each of the cathodes; and wherein

the anodes and the cathoes are alternatingly disposed with respect to each other,

the side edges of each of the anodes and the side edges of each of the cathodes, except for the portions for passing an electric current of each of the anodes and each of the cathodes, are spaced from the inner wall of the housing,

and each of the flat plate-like cathodes and each of the flat plate-like anodes have an external contour such that the external contour of each of the flat plate-like cathodes, except for the portions for passing an electric current to each of the cathodes, is located inwardly of the external contour of each of the flat plate-like anodes.

4,173,526

CHLOR-ALKALI CELL DIAPHRAGM AND ITS TREATMENT

James C. Fang, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 21, 1978, Ser. No. 962,716
Int. Cl.[2] C25B *1/16, 1/26, 13/04*
U.S. Cl. 204—296 **8 Claims**

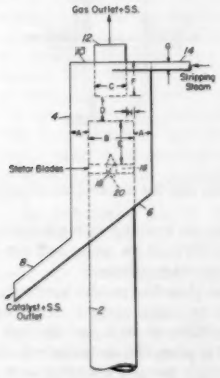
1. A diaphragm for a chlor-alkali cell comprising asbestos and at least one magnesium compound selected from magnesium oxide, hydroxide, carbonate, oxyhalide and hydroxyhalide (wherein the halide is at least one of fluorine and chlorine), the magnesium compound being present in an amount of about 5–50% by weight based on the asbestos plus the magnesium compound.

4,173,527

METHOD AND MEANS FOR SEPARATING SUSPENSIONS OF GASIFORM MATERIAL AND FLUIDIZABLE SOLID PARTICLE MATERIAL

Scott A. Heffley, Bolingbrook, Ill., and Klaus W. Schatz, Wenonah, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 1, 1978, Ser. No. 874,263
Int. Cl.[2] C10G *13/18;* **B01J** *37/12*
U.S. Cl. 208—153 **7 Claims**



1. An improved method for separating a suspension of catalyst and gasiform material passed through a riser contact zone which comprises,

passing a rising suspension of catalyst and gasiform material upwardly through an elongated riser contact zone, imposing a horizontal centrifugal separating moment on the suspension below but adjacent to the riser open upper end sufficient to accumulate upflowing catalyst on the riser wall before ejecting the catalyst particles thus separated in contact with tangentially introduced stripping gas in an annular zone there-above of larger diameter than said riser and about an open ended vertically extending coaxial passageway of smaller diameter than said riser through which gasiform products separated from catalyst particles are passed,

withdrawing catalyst particles separated from gasiform product downwardly through a first confined annular zone about the upper end of said riser,

stripping catalyst withdrawn by said first confined annular zone in a separate second annular zone,

passing stripping gas and gasiform products through a plurality of cyclone separation zones in an upper portion of said zone comprising said second annular zone above said open ended passageway, and

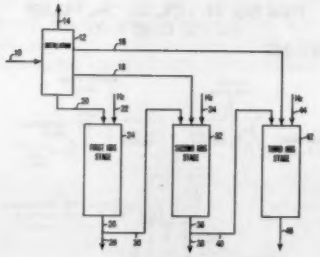
passing catalyst particles separated by said cyclone separation zones into said second annular stripping zone.

4,173,528

MULTISTAGE RESIDUAL OIL HYDRODESULFURIZATION PROCESS EMPLOYING SEGMENTED FEED ADDITION AND PRODUCT REMOVAL

James A. Frayer, Pittsburgh; Harry C. Stauffer, Cheswick, and Stephen J. Yanik, Valencia, all of Pa., assignors to Gulf Research and Development Company, Pittsburgh, Pa.

Filed Oct. 20, 1977, Ser. No. 843,879
Int. Cl.[2] C10G *23/02*
U.S. Cl. 208—210 **8 Claims**



1. A process for the hydrodesulfurization of an aromatics- and asphaltene-containing feed oil to produce at least three hydrodesulfurized residual oil streams having different respective asphaltene and sulfur contents, said process employing upstream, intermediate and downstream hydrodesulfurization stages containing hydrodesulfurization catalyst comprising Group VI and Group VIII metal on a noncracking support at a temperature between 600° and 900° F. and a hydrogen pressure between 500 and 5,000 psi, said process comprising fractionating said feed oil into an asphaltene-containing residual oil stream, a heavy distillate oil stream and a light distillate oil stream, passing said residual oil stream and hydrogen through said upstream hydrodesulfurization stage and recovering an upstream stage effluent stream containing refractory sulfur asphaltenes, splitting said upstream stage effluent stream into a first upstream stage effluent portion comprising between about 10 and 75 weight percent of the normally liquid material in said upstream stage effluent stream and a second upstream stage effluent portion, removing said first upstream stage effluent portion from said process to selectively remove refractory sulfur asphaltenes from said process and to increase the concentration of more sulfur-reactive material in said intermediate stage, passing said second upstream stage effluent portion and

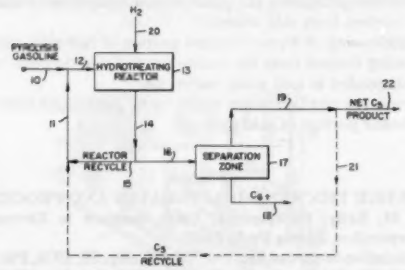
said heavy distillate oil stream and hydrogen through said intermediate stage, said heavy distillate oil stream by-passing said upstream stage, recovering an intermediate stage effluent stream containing refractory sulfur asphaltenes, dividing said intermediate stage effluent stream into a first intermediate stage effluent portion comprising between about 10 and 75 weight percent of the normally liquid material in said intermediate stage effluent stream and a second intermediate stage effluent portion, removing said first intermediate stage effluent portion from said process to selectively remove refractory sulfur asphaltenes from said process and to increase the concentration of more sulfur-reactive material in said downstream stage, passing said second intermediate stage effluent portion and said light distillate oil stream and hydrogen through said downstream stage, said light distillate oil stream by-passing said upstream and intermediate stages, and recovering a downstream stage effluent stream, said downstream stage effluent stream containing aromatics and having a sulfur concentration which is at least 75 percent lower than the sulfur concentration of said feed oil, the removal of said first upstream stage effluent portion and said first intermediate stage effluent portion allowing the sulfur concentration in said downstream stage effluent stream to be achieved with a relatively high aromatics concentration as compared to the aromatics concentration when achieving the same sulfur concentration by hydrodesulfurization without selective removal of refractory sulfur asphaltenes.

4,173,529

HYDROTREATING OF PYROLYSIS GASOLINE

William V. Bauer, New York, N.Y., assignor to The Lummus Company, Bloomfield, N.J.

Filed May 30, 1978, Ser. No. 910,822
Int. Cl.[2] C10G *23/00*
U.S. Cl. 208—255 **14 Claims**



1. In a process for the catalytic hydrotreating of a pyrolysis gasoline to reduce the diene content thereof wherein a hydrotreated product portion is recycled to the hydrotreating, the improvement comprising:

separating a C_5 fraction from the hydrotreated effluent; and employing a portion of the separated C_5 fraction as a portion of the hydrotreated product portion recycled to the hydrotreating to thereby reduce the Diene Value of a remaining net C_5 product.

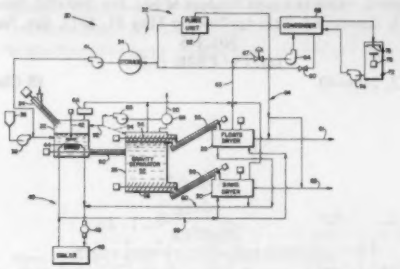
4,173,530

METHODS OF AND APPARATUS FOR CLEANING COAL

Clay D. Smith, and Douglas V. Keller, Jr., both of Lafayette, N.Y., assignors to Otisca Industries, Ltd., Lafayette, N.Y.

Continuation-in-part of Ser. No. 423,577, Jan. 14, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,168
Int. Cl.[2] B03B *1/00, 5/44*
U.S. Cl. 209—9 **60 Claims**

1. In that method of beneficiating coal to separate it from foreign material mixed therewith in which the coal is introduced into a body of parting liquid which is or contains a halogenated hydrocarbon and has a specific gravity intermediate those of the coal and foreign material so that the coal will rise toward the top of the body of liquid and the foreign material will sink toward the bottom thereof, the improvement wherein any halogenated hydrocarbon present in the parting liquid is 1,2-difluoroethane or a fluorochloro derivative of



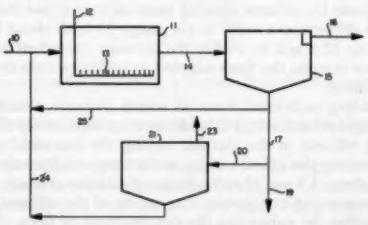
methane or ethane selected from the group consisting of 1-chloro-2,2,2-trifluoroethane, 1-1-dichloro-2,2,2-trifluoroethane, dichlorofluoromethane, 1-chloro-2-fluoroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1-dichloro-1,2,2,2-tetrafluoroethane, and trichlorofluoromethane.

4,173,531

NITRIFICATION-DENITRIFICATION OF WASTEWATER

Ladislas C. Matsch, Amherst, and Raymond F. Drnevich, Clarence, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Nov. 23, 1977, Ser. No. 854,321
Int. Cl.[2] C02C *1/06*
U.S. Cl. 210—5 **11 Claims**



1. In the purification of wastewater by the activated sludge method in which wastewater containing nitrogenous compounds is mixed in an oxic zone in the presence of carbonaceous compounds with oxygen-containing gas and activated sludge containing carbon-consuming and nitrogen-oxidizing bacteria for sufficient duration to nitrify the nitogenous compounds and form nitrified oxygenated mixed liquor which is discharged from the oxic zone and passed to a separate zone to effect concentration of solids from liquor with at least a major part of the concentrated solids being returned to said oxic zone as said activated sludge such that the total mean residence time of solids (SRT) is at least two days, the improvement comprising withdrawing and introducing nitrified oxygenated liquid-solid to an anoxic zone at volume flow rate less than one-half the volume flow rate of nitrified oxygenated mixed liquor entering the solids concentration zone, maintaining said nitrified oxygenated liquid-solid in said anoxic zone under anoxic conditions for a period between 0.4 and 36 hours and sufficient to denitrify the liquid-solid and form nitrogen-containing gas, releasing said nitrogen-containing gas and returning the denitrified liquid-solid to said oxic zone.

4,173,532

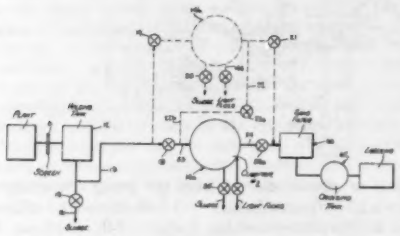
METHOD FOR TREATING PLANT EFFLUENT

Hagop Keoteklian, Islip, N.Y., assignor to Entenmann's, Inc., Bay Shore, N.Y.

Continuation-in-part of Ser. No. 662,286, Feb. 27, 1976, abandoned, which is a continuation of Ser. No. 449,003, Mar. 7, 1974, abandoned. This application May 27, 1977, Ser. No. 801,375

Int. Cl.[2] C02B *1/20*

U.S. Cl. 210—49 **15 Claims**



1. A process for the continuous removal of wastes from industrial liquid effluent containing a high concentration of starches and sugars, by subjecting the effluent to a plurality of changes in the pH thereof, comprising the sequential steps of:

(a) receiving liquid industrial effluent;

(b) adding to the effluent an agent for inhibiting fermentation;

(c) continuously flowing the effluent into a clarifier and adding to the flow of the effluent, material which includes a primary coagulant and which is acidic, for lowering the pH of the effluent to a value in the range of from about 2.5 to 3.5 and to aid in the hydrolysis of the starches and sugars;

(d) inducing continuous circulation of the flow of effluent having lower pH in said clarifier, and immediately admixing into the effluent alkaline material to increase the pH of the effluent to a value in the range of from about 11.5 to about 12.5 and to enable the primary coagulant to form flocs therein, the flocs adapted to collect wastes from the effluent;

(e) adding additional material which includes a secondary coagulant and which is acidic to the continuously circulating effluent in the clarifier having the increased pH for lowering the pH to a value in the range of from about 7.5 to about 8.5 and thereby forming additional flocs;

(f) maintaining continuous circulation of the effluent in the clarifier for enhancing the development of flocs, the collection of wastes by the flocs, and the separation thereof from the effluent, and

(g) separating the flocs and the wastes collected therefrom from the effluent,

(h) discharging the clarifier effluent; and

(i) discharging the separated flocs.

4,173,533

METHOD FOR REMOVING SUSPENDED OIL DROPLETS FROM WATER

Robert E. Williams, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Nov. 7, 1977, Ser. No. 848,961

Int. Cl.[2] B01D *37/02*

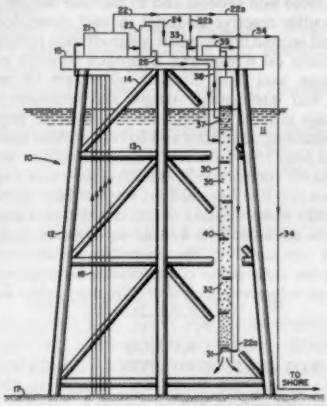
U.S. Cl. 210—73 W **6 Claims**

1. A method of separating oil droplets suspended in a waste water stream produced on an offshore rig comprising:

introducing said waste water stream into a substantially submerged pipe vertically positioned adjacent said rig;

introducing a gas from a separator above the water surface into a line which extends from above the water surface adjacent said pipe to the lower portion of said pipe;

injecting said gas from said line at the lower portion of said pipe directly into a diffuser which disperses said gas by means of said diffuser into bubbles which countercurrently contact said waste water stream as they rise through said pipe so as to reduce the overall density of said suspended oil droplets sufficiently so that the upward velocity of said oil droplets is greater than the downward velocity of said waste water, thereby promoting the gravitational separation of said oil droplets from said waste water, and wherein said bubbles are subjected to a reduced hydrostatic pressure as said bubbles rise causing said bubbles to grow in size such that the increased size enables said bubbles to capture more oil droplets thereby further promoting the gravitational separation of said oil droplets from said water;



withdrawing oil from the upper portion of said pipe, said oil being formed from the coalescence of said droplets of oil suspended in said waste water; and

permitting clarified waste water to be discharged from the lower portion of said pipe.

4,173,534

SLUDGE THICKENING APPARATUS AND PROCESS

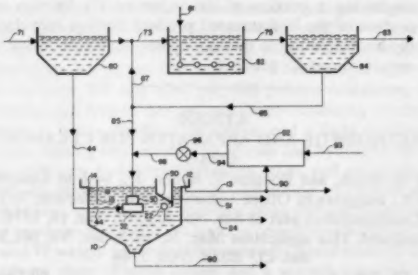
Earl M. Kelly, Hillsborough, Calif., assignor to Envirotech Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 728,480, Sep. 30, 1976, Pat. No. 4,082,671. This application Dec. 12, 1977, Ser. No. 859,768

The portion of the term of this patent subsequent to Apr. 4, 1995, has been disclaimed.

Int. Cl.[2] C02B *3/00*

U.S. Cl. 210—195.3 **10 Claims**



1. In a wastewater treatment system of the activated sludge type including a primary clarifier, a biological treatment unit and a secondary clarifier, the improvement comprising:

a. a treatment unit for concomitantly treating primary sludge

and aerated secondary sludge, said treatment unit including an open tank and a continuous partition wall mounted to define a confined liquid zone in the upper part of said tank;

b. means connected in communication between the primary clarifier and said tank for introducing primary sludge into the lower part of said tank, said means including first feedwell means;

c. float collection means mounted within said confined liquid zone in said tank for collecting solids floating on the surface of the liquid within said confined zone;

d. sediment collection means connected in communication with the bottom of said tank for collecting and discharging sediment therefrom;

e. discharge means mounted in said tank outside said confined liquid zone for drawing effluent liquid from the surface of the body of liquid held in said tank outside said confined liquid zone;

f. pressurized aeration means connected in liquid-flow communication with said discharge means to aerate a portion of the effluent liquid at super atmospheric pressure;

g. means to introduce the aerated effluent liquid into a stream of secondary sludge to produce aerated secondary sludge; and

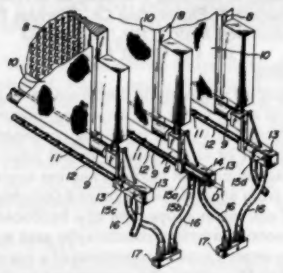
h. means coupled in flow communication with the secondary clarifier to convey the aerated secondary sludge into the upper part of said tank above said first feedwell means, said means including a second feedwell means.

4,173,535

FILTER CLOTH WASHING DEVICE FOR FILTER PRESS

Hiromasa Nakashima, Tajimi, Japan, assignor to NGK Insulators, Ltd., Nagoya, Japan

Filed Mar. 29, 1978, Ser. No. 891,285
Claims priority, application Japan, Apr. 5, 1977, 52-41594[U]
Int. Cl.[2] B01D *25/32*
U.S. Cl. 210—225 **2 Claims**



1. In a filter cloth washing device for a filter press, wherein washing water is sprayed on filter cloths respectively trained about lower rollers positioned below the bottom end of respective filter plates and adapted to travel thereabout, thereby washing respective filter cloths, the improvements comprising

a plurality of washing water supply pipes respectively having a plurality of spraying nozzles and running in parallel to said respective lower rollers;

a plurality of coupling means connected to at least one end of each of said water supply pipes, respectively, each of said coupling means having an inner diameter larger than an inner diameter of its respective water supply pipe, and first and second communication ports; and

a plurality of flexible pressure hoses for connecting the neighboring coupling means to each other, wherein a metallic joint is provided to connect two flexible pressure pipes for interconnecting the neighboring coupling means;

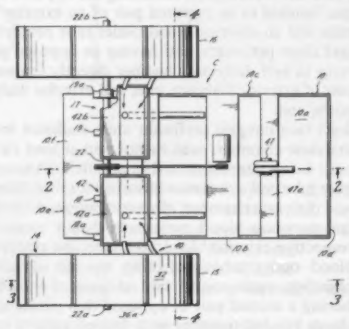
the connection among the neighboring coupling means being such that the first communication port in one coupling means attached to one filter plate is connected by way of one flexible pressure hose through the metallic joint to a first communication port in another coupling means attached to another filter plate upstream of said one filter plate, and the second communication port in said one coupling means is connected by way of another flexible pressure hose through another metallic joint to a second communication port in another coupling means attached to another filter plate downstream of said one filter plate.

4,173,536

SURFACE FLUID COLLECTOR

Richard H. McCall, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 27, 1977, Ser. No. 864,168
Int. Cl.[2] E02B *15/04*
U.S. Cl. 210—242 S **10 Claims**



1. Apparatus for skimming a surface fluid from a main fluid, comprising:

a collection housing means having an annular skimming chamber; and

said rotating annular skimming chamber having a skim valve means, said skim valve means opening when said chamber is rotated into such surface and main fluids and closing after such chamber is rotated out of such fluids.

2. An apparatus for skimming a surface fluid, comprising;

a floating collection housing adapted to float in a main fluid having such surface fluid located on the surface of such main fluid;

rotating skimming means, said rotating skimming means including rotation mount means for mounting an annular skimming chamber on said collection housing for rotation with respect to said collection housing into such surface and main fluids for skimming such surface fluid off of said main fluid into said rotating skimming means and for transferring such skimmed fluid into said collection housing after rotation out of such main fluid,

said annular skimming chamber comprising a plurality of skim compartments for skimming the surface fluid and collecting same in said compartments, wherein each compartment includes skim valve means;

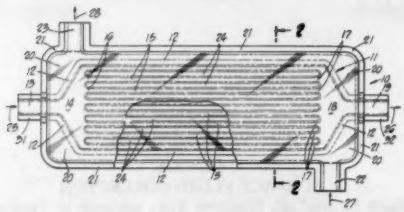
said rotation mount means rotating said skim compartments into and out of such surface and main fluids; and

said skim valve means for each compartment opening when its compartment is rotated into such surface and main fluids and closing after each such compartment is rotated out of such surface and main fluids.

4,173,537
INTEGRAL ARTIFICIAL KIDNEY UNIT

Earle E. Newhart, deceased, late of Newport Beach, Calif., and by Ruth Newhart, executor, 1907 Leeward La., Newport Beach, Calif. 92660

Filed May 23, 1977, Ser. No. 799,501
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—321 B **10 Claims**



1. An integral artificial kidney unit, the unit combination comprising:

a dialysate solution chamber having an opposed first pair of plastic composition sheets bonded together at all the opposed sheet perimeter, excluding the opposed sheet perimeter bonded to an opposed pair of an exterior blood inlet tube and an exterior blood outlet tube projecting outside said sheet perimeter, and having an opposed pair of apertures in said dialysate chamber directly connected to the pair of exterior dialysate inlet and exterior dialysate outlet ports; and,

at least two integral perfusion units enclosed inside of said dialysate chamber, each one of said at least two perfusion units being interconnected in parallel to a common blood inlet tube and a common blood outlet tube disposed inside said dialysate chamber, aforesaid common blood inlet tube and common blood outlet tube being connected to the respective exterior blood inlet tube and aforesaid exterior blood outlet tube projecting outside of said dialysate chamber, each one of said at least one perfusion units having a second pair of opposed thin plastic composition sheets bonded together in a desired pattern including its exterior edges, each one of said perfusion units having an integral interconnecting blood inlet port disposed and interconnected to a blood inlet manifold, said inlet manifold being disposed across and interconnected to multiple parallel blood tubules having small diameters, a blood outlet manifold being disposed across and interconnected to the termini of the blood tubules opposed to the blood inlet manifold, a blood outlet port being interconnected to the blood outlet manifold at the manifold section opposed to the tubule termini, each one of said perfusion units having their respective blood inlet ports interconnected in parallel to said common blood inlet tube and having their respective blood outlet ports interconnected in parallel to said common blood outlet tube, aforesaid second pair of thin plastic composition sheets having a high permeability to waste excreta products in patient blood.

4,173,538
EXTINGUISHING PRODUCT COMPRISING AN UNINFLAMMABLE POWDER AND LIQUID

Celestin L. Herbline, Domaine Bracheux Fouquenies Oise, France

Continuation-in-part of Ser. No. 705,977, Jul. 16, 1976, abandoned. This application Jun. 9, 1978, Ser. No. 913,987
Claims priority, application France, Oct. 8, 1975, 75 30866
Int. Cl.[2] C09K *3/28*
U.S. Cl. 252—8 **11 Claims**

1. A substantially non-toxic extinguishing product capable of forming a refractory coating on a surface consisting essentially of an uninflammable powder selected from the group consisting of silica, alumina, silico-sodium aluminate, silicates of soda and mixtures thereof and an uninflammable liquid in which the powder is insoluble, the powder having an apparent density less than the density of the liquid and being capable of absorbing at least about 75% of its own weight of water and still remain in powdered form.

4,173,539
CATIONIC SURFACTANT COMPOSITIONS

Robert B. Rule, Liverpool; Martin A. Wells, Wirral, and John D. Dance, High Wycombe, all of England, assignors to Lever Brothers Company, New York, N.Y.

Filed Oct. 31, 1978, Ser. No. 956,234
Claims priority, application United Kingdom, Oct. 31, 1977, 45254/77
Int. Cl.[2] D06M *13/34*
U.S. Cl. 252—8.8 **12 Claims**

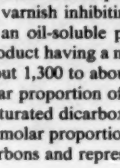
1. A pourable liquid fabric-softening composition of uniform turbidity comprising a dispersion in an isotropic aqueous medium of positively charged particles of softening agent with a melting point of below 95° C., which particles comprise a quaternary ammonium salt fabric softener having one straight-chain aliphatic hydrocarbon radical with from 12 to 24 carbon atoms, the chloride salt of whose cation A has a Krafft point in water of less than 95° C., complexed with the anion B of an anionic surfactant salt having one straight-chain aliphatic hydrocarbon radical with from 12 to 24 carbon atoms, the normality ratio of A to B being in the range from 1.1:1 to 5:1, the total weight of A and B present being from 2 to 15% by weight of the composition, and the composition having a clear point of above 95° C.

4,173,540
LUBRICATING OIL COMPOSITION CONTAINING A DISPERSING-VARNISH INHIBITING COMBINATION OF POLYOL ESTER COMPOUND AND A BORATED ACYL NITROGEN COMPOUND

Thor F. Lonstrup, Plainfield; Darrell W. Brownawell, Scotch Plains, and Barry J. Howlett, Westfield, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Oct. 3, 1977, Ser. No. 838,543
Int. Cl.[2] C10M *1/10*
U.S. Cl. 252—49.6 **6 Claims**

1. A lubricating oil composition comprising a major amount of lubricating oil and a minor but dispersing amount of a dispersing and synergistic varnish inhibiting combination of: (a) one part by weight of an oil-soluble polyol ester dispersant which is the reaction product having a number average molecular weight of from about 1,300 to about 8,000 obtained from the reaction of one molar proportion of a hydrocarbyl substituted C_4–C_{10} monounsaturated dicarboxylic acid material and from about 1 to about 2 molar proportions of a polyol containing a total of 4 to 10 carbons and represented by the formula:



wherein X is hydrogen, an alkyl, or hydroxy alkyl group, with at least one of the X substituents being a hydroxy alkyl group of the structure $-(CH_2)_nOH$, wherein n is 1 to 3; and (b) from 0.25 to 4 parts by weight of an oil-soluble borated acylated nitrogen dispersant compound having a number average molecular weight ranging from about 1,300 to 8,000 characterized by the presence within its structure of a substantially saturated hydrocarbon-substituted polar group selected from the class consisting of acyl, acylimidoyl, and acyloxy radicals wherein the substantially saturated hydrocarbon substituent contains at least about 80 aliphatic carbon atoms and a nitrogen-containing group characterized by a nitrogen atom attached directly to said polar radical.

4,173,541

POLYNUCLEAR HINDERED PHENOLS AND STABILIZED ORGANIC MATERIALS CONTAINING THE PHENOLS

Kenneth R. Molt, Cincinnati, Ohio, assignor to Cincinnati Milacron Chemicals Inc., Reading, Ohio

Filed Jun. 5, 1978, Ser. No. 912,171

Int. Cl.[2] C10M *1/26;* C10L *1/18;* C11C *3/02;* C07C *43/20*

U.S. Cl. 252—52 R **69 Claims**

1. A compound characterized by a six carbon atom aromatic nucleus having attached thereto (1) at the 2, 4 and 6 positions a 3,5-dihydrocarbyl-4-hydroxy benzyl group and (2) through oxygen from one to two organic groups, the remaining groups attached to the nucleus being hydrogen or a hydrocarbyl group, with the proviso that when there is present only one organic group attached to the nucleus through oxygen said organic group must be a 3,5-dihydrocarbyl-4-hydroxyphenyl alkanoic acid radical.

4,173,542

HYDRAULIC FLUID COMPRISING A BORATE ESTER AND CORROSION INHIBITING AMOUNTS OF AN OXYALKYLATED ALICYCLIC AMINE

Teruyuki Sato, Yawata, and Kunio Kawakatsu, Kyoto, both of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed May 19, 1978, Ser. No. 907,723

Claims priority, application Japan, May 31, 1977, 52-64420

Int. Cl.[2] C10M *3/26, 3/48*

U.S. Cl. 252—78.1 **18 Claims**

1. A hydraulic fluid composition comprising (A) a hydraulic fluid containing a borate ester and (B) a corrosion inhibiting amount of an oxyalkylated alicyclic amine.

4,173,543

C_{10}-TERPENE ALKYL, ALKENYL, HALOALKYL, AND ALKYNYL ETHERS AND DIETHERS, PROCESSES FOR PREPARING SAME AND ORGANOLEPTIC USES THEREOF

Cynthia J. Mussinan, Bricktown; Braja D. Mookherjee, Holmdel; Manfred H. Vock, Locust; Frederick L. Schmitt, Holmdel, all of N.J.; Edward J. Shuster, Brooklyn, N.Y.; James M. Sanders, Eatontown, N.J.; Bette M. Light, Highlands, N.J., and Edward J. Granda, Englishtown, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 872,937, Jan. 27, 1978, Pat. No. 4,131,687. This application Sep. 5, 1978, Ser. No. 939,896

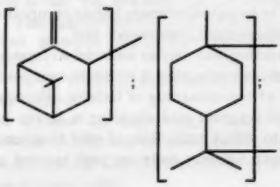
Int. Cl.[2] C11D *3/50*

U.S. Cl. 252—174.11 **14 Claims**

1. A process for augmenting or enhancing the aroma of a solid or liquid detergent comprising the step of adding to a detergent base or a soap base from 0.01% up to 0.5% of a C_{10} terpenyl ether having the structure:

$$(C_{10}\text{ - TERPENYL})\text{—}(O\text{—}R_1)_n$$

wherein n is 1 or 2, R_1 is C_1–C_4 alkyl, C_3 or C_4 alkenyl, C_3 alkynyl, or C_3 haloalkenyl, and the C_{10}-terpenyl moiety is selected from the group consisting of:



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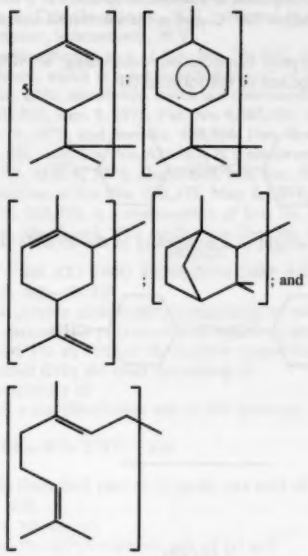


4,173,544

NOVEL ALKYLSUBSTITUTED N-BENZYLIDENEANILINES AND LIQUID CRYSTAL COMPOSITIONS CONTAINING SAME

Maged A. Osman, Zürich, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

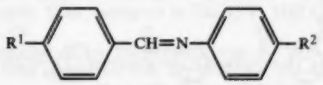
Filed Dec. 15, 1976, Ser. No. 750,646

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1975, 2557267

Int. Cl.[2] C09K *3/34;* G02F *1/13;* C07C *119/00*

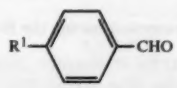
U.S. Cl. 252—299 **4 Claims**

1. In a process for producing compounds of formula



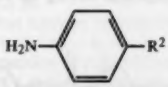
(III)

in which R^1 and R^2 are selected each from the group consisting of hydrogen and alkyl radicals including from 1 to about 10 C-atoms, at least one of said groups R^1 and R^2 being an alkyl group, by condensation of a benzaldehyde compound of formula



(IV)

in which R^1 is as defined above, with an aniline compound of formula

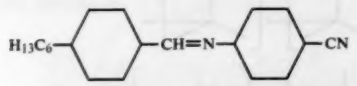


(VI)

in which R^2 is as defined above; the improvement consisting of

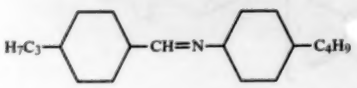
effecting said condensation of said benzaldehyde compound and said aniline compound in substantial absence of a solvent, at temperatures below 100° C. and in the substantial absence of oxygen.

2. A liquid crystal composition comprising 80–90% by weight of a compound of the formula (I)



(I)

and 10–20% by weight of a compound of the formula (II)



(II)

4,173,545

LIQUID CRYSTAL WITH HIGH NEGATIVE DIELECTRIC ANISOTROPY AND MIXTURES OF THE SAME WITH NEMATIC LIQUID CRYSTALS FOR IMPROVING DYNAMIC SCATTERING IN ELECTRO-OPTIC DEVICES

Alain Béguin; Jean-Claude Dubois, and Annie Zann, all of Paris, France, assignors to Thomson-CSF, Paris, France

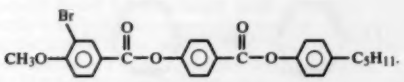
Continuation of Ser. No. 785,113, Apr. 6, 1977, abandoned. This application Jun. 6, 1978, Ser. No. 913,106

Claims priority, application France, Apr. 6, 1976, 76 09884; Jul. 7, 1976, 76 20768

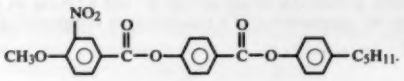
Int. Cl.[2] **C09K** *3/34;* **C02F** *1/13;* **C07C** *69/88, 79/46, 121/64, 121/75*

U.S. Cl. 252—299 **7 Claims**

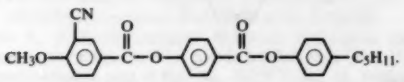
1. A liquid crystal compound having the formula



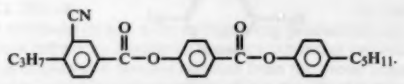
2. A liquid crystal compound having the formula



3. A liquid crystal compound having the formula



4. A liquid crystal compound having the formula



4,173,546

METHOD OF TREATING WASTE MATERIAL CONTAINING RADIOACTIVE CESIUM ISOTOPES

John F. Hayes, 25305 Country Club Blvd., North Olmsted, Ohio 44070

Continuation of Ser. No. 708,473, Jul. 26, 1976, abandoned. This application Apr. 26, 1978, Ser. No. 900,076

Int. Cl.[2] **G21F** *9/16*

U.S. Cl. 252—301.1 W **14 Claims**

1. In the method of treating waste material containing radioactive cesium isotopes by mixing said waste material with a water soluble alkali metal silicate and a sufficient amount of an alkali metal silicate hardening agent to form a solidified mass, the improvement which comprises adding an effective amount of particles of shale to said waste material prior to the formation of said solidified mass to immobolize cesium isotopes present in said waste material upon solidification thereof whereby the leachability of said cesium isotopes is significantly reduced when said solidified mass is subjected to an aqueous environment.

4,173,547

CATALYST FOR PREPARING POLYALKENES

Renier J. L. Graff, Stein, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Filed Mar. 8, 1978, Ser. No. 884,546

Claims priority, application Netherlands, Mar. 4, 1977, 7702323

Int. Cl.[2] **C08F** *4/64*

U.S. Cl. 252—429 B **13 Claims**

1. A process for preparing a catalyst component composition suitable for α-alkene polymerization reactions, which consists essentially in treating a carrier material selected from the group consisting of

a solid porous particulate inorganic carrier having an average particle size of between about 0.1 and 200 microns, and composed of oxidic materials or compounds of metals from Groups I and II of the Periodic Table, and

a particulate polyalkene powder,

by the steps of:

(a) contacting said carrier material with a first liquid phase containing an organometallic compound selected from the group consisting of an organoaluminum halide compound of the general formula R_mAlX_{3-m} wherein

each R independently represents a hydrocarbon radical with 1 to 30 carbon atoms,

each X represents a halogen atom, and

m is a number smaller than 3, and

an ether-free solution containing an organomagnesium compound of the general formula MgR_2' wherein each R' independently represents a hydrocarbon radical having from 1 to 30 carbon atoms, whereafter said carrier material so treated is separated from said first liquid phase;

(b) thereafter contacting said carrier material so treated with a second liquid phase containing the other organometallic compound member of said group whereafter said carrier material so treated is separated from said second liquid phase, so that said carrier material has then been contacted separately with an organoaluminum halide compound and with an organomagnesum compound; and

(c) thereafter contacting said carrier material so treated with a third liquid phase containing a titanium compound selected from the group consisting of halides, alkoxides and mixtures thereof wherein said titanium is in the highest valency, so as to effect reduction of said titanium compound to a lower valency state on said treated carrier material.

4,173,548

ETHYLENE POLYMERIZATION CATALYST AND METHOD

Thomas J. Pullukat, Hoffman Estates; Mitsuzo Shida, Barrington, and Raymond E. Hoff, Palatine, all of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 764,914, Feb. 2, 1977, abandoned. This application Jun. 12, 1978, Ser. No. 915,056

Int. Cl.[2] C08F *4/02;* B01J *31/14, 21/02, 23/36*

U.S. Cl. 252—430 26 Claims

1. A highly active catalyst for polymerizing ethylene to polyethylene or to copolymers of ethylene with alpha-olefins having a narrow molecular weight distribution, prepared by: forming a mixture of (1) a porous support of the class consisting of silica, alumina, zirconia, thoria and mixtures thereof, (2) a chromium compound and (3) an alkyl ester of boron containing 1 to about 7 carbon atoms in the alkyl group or a halide of boron, said (2) being reactive with (3) to form a chromium-boron compound upon heating, said mixture containing about 0.1–10 wt.% of boron and about 0.1–10 wt.% of chromium and (4) activating said mixture at an elevated temperature in a fluidized bed with a substantially dry reducing gas and then fluidizing (4) with (5) an oxidizing gas at an elevated temperature.

4,173,549

CATALYST COMPOSITION FOR DECOMPOSING OZONE

Ronald A. Kent, Ridgewood, and Marvin M. Fein, Westfield, both of N.J., assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Sep. 22, 1978, Ser. No. 944,836

Int. Cl.[2] B01J *21/06, 23/68, 23/72*

U.S. Cl. 252—463 24 Claims

1. A catalyst composition for the decomposition of ozone which comprises:

(a) metallic silver deposited on a relatively high surface area copper substrate, and

(b) a composite of a relatively high surface area zirconia and oxides of manganese.

4,173,550

PERFUMED ARTICLES CONTAINING 3-PHENYL-CYCLOPENT-2-EN-1-ONE

Erling Sundt, Vessy, and Roland Aschiero, Bernex, both of Switzerland, assignors to Firmenich SA, Geneva, Switzerland

Division of Ser. No. 896,440, Apr. 14, 1978, Pat. No. 4,144,200. This application Oct. 23, 1978, Ser. No. 953,916

Claims priority, application Switzerland, May 6, 1977, 005689/77

Int. Cl.[2] C11B *9/00;* C11D *3/50, 9/44*

U.S. Cl. 252—522 2 Claims

1. A method for improving, enhancing or modifying the odoriferous properties of perfumed articles which method comprises adding thereto an effective amount of 3-phenyl-cyclopent-2-en-1-one.

4,173,551

HEAT CURABLE COMPOSITIONS

James V. Crivello, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 781,785, Mar. 28, 1977, abandoned, which is a continuation-in-part of Ser. No. 689,247, May 24, 1976, abandoned, which is a continuation-in-part of Ser. No. 638,982, Dec. 9, 1975, Pat. No. 4,058,401, Ser. No. 638,983, Dec. 9, 1975, and Ser. No. 638,994, Dec. 9, 1975, Pat. No. 4,069,055, said Ser. No. 638,982, is a continuation of Ser. No. 466,374, May 2, 1974, abandoned, said Ser. No. 638,983, is a continuation of Ser. No. 466,375, May 2, 1974, abandoned, said Ser. No. 638,994, is a continuation of Ser. No. 466,378, May 2, 1974, abandoned. This application Dec. 16, 1977, Ser. No. 861,128

Int. Cl.[2] C08G *59/68, 8/10;* C08F *4/00, 4/06*

U.S. Cl. 260—18 EP 16 Claims

1. A curable composition comprising by weight

(A) a cationically polymerizable organic material, and

(B) from 1% to 35% of the curable composition of a catalyst selected from the class consisting of

(i) a mixture of

(a) a diaryliodonium salt of the formula,

$$[(R)_a(R^1)_b I]^+[Y]^-, \text{ and}$$

(b) from 0.01 part to 10 parts, per part of (a), of a copper salt,

(ii) a mixture of

(c) the diaryliodonium salt of (a) and

(d) from 0.1 part to 15 parts, per part of (c), of organic acid, organic anhydride, or mixtures thereof and

(iii) a mixture of

(e) the diaryliodonium salt of (a)

(f) from 0.01 part to 10 parts, per part of (e), of the copper salt of (b), and

(g) from 0.1 part to 15 parts, per part of (e), of the organic acid, organic acid anhydride or mixtures thereof of (c), where R is a monovalent aromatic organic radical, R^1 is a divalent aromatic organic radical, a is a whole number equal to 0 or 2, b is a whole number equal to 0 or 1 and when a is 0, b is 1, and when b is 0, a is 2 and Y is an anion.

4,173,552

RUBBER ADDITIVES

Vincent P. Kuceski, Chicago Heights, Ill., and Lenoir Black, Memphis, Tenn., assignors to The C. P. Hall Company, Chicago, Ill.

Continuation of Ser. No. 496,611, Aug. 12, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,424

Int. Cl.[2] C08C *19/20;* C08K *5/10*

U.S. Cl. 260—23.7 M 16 Claims

1. A natural or synthetic olefinic rubber composition comprising the rubber, sulfur and a vulcanization activating effective amount of a vulcanization activator for said rubber comprising an aliphatic polycarboxylic acid having 4 to 54 carbon atoms, wherein said activator is not volatile at 200° F. and has an acid number of at least 50.

4,173,553

NON-COLORING, ABRASION RESISTANT, ADHERENT COATING FOR GOLD AND SILVER SURFACES

Loren A. Haluska, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 23, 1977, Ser. No. 863,969

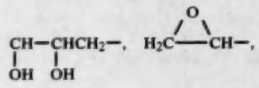
Int. Cl.[2] C08J *3/02;* C08L *83/04*

U.S. Cl. 260—29.2 M 14 Claims

1. A pigment free aqueous coating composition comprising a dispersion of colloidal silica in a lower aliphatic alcohol-water solution, or a dispersion of colloidal silica in an ether alcohol-water solution, of a partial condensate of a mixture of silanols of the formula $RSi(OH)_3$ in which R is selected from the group consisting of alkyl radicals of 1–3 inclusive carbon atoms and

R′ wherein R′ is selected from $R''(S)_nR'''$— and $(HS)_aR'''$— wherein

R″ is a substituted or unsubstituted monovalent hydrocarbon radical of 1 to 6 carbon atoms wherein the hydrocarbon atom is substituted by radicals selected from the group consisting of —COOH, —COH,



HS—, $—NH_2$, $NH(R'''')_x$, Cl, Br and vinyl,

n has a value of 1–4 and a has a value of 1 or 2,

R‴ is a divalent hydrocarbon radical containing 1–6 carbon atoms,

R⁗ is an alkyl radical of 1–4 carbon atoms,

x is 1 or 2,

at least 50 weight percent of the silanol being $CHSi(OH)_3$ and at least 0.4 weight percent of the silanol being $R'Si(OH)_3$, said composition containing 10 to 50 weight percent solids consisting essentially of 10 to 70 weight percent colloidal silica and 30 to 90 weight percent of the partial condensate, said composition containing sufficient acid to provide a pH in the range of 2.8 to 5.5.

4,173,554

AQUEOUS PRINTING INKS WITH IMPROVED TRANSFER PROPERTIES

Theodore Sulzberg, Highland Park, N.J., assignor to Sun Chemical Corporation, New York, N.Y.

Filed Jul. 10, 1978, Ser. No. 923,152

Int. Cl.[2] C09D *11/06, 11/08, 11/10*

U.S. Cl. 260—29.2 EP **2 Claims**

1. In an aqueous printing ink which comprises a pigment, a varnish, and a resin, the improvement which comprises incorporating in said ink about 0.8 to 2.0 parts by weight of a polyethylene oxide having an average molecular weight between about 100,000 and 400,000, about 0.8 to 4.0 parts by weight of a potassium salt, and about 1.6 to 8.0 parts by weight of a urea.

4,173,555

GROUTING COMPOSITION CONTAINING CUPRIC ACRYLATE

Kenneth G. Phillips, River Forest, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Mar. 12, 1979, Ser. No. 19,996

Int. Cl.[2] C08F *220/06*

U.S. Cl. 260—29.7 H **1 Claim**

1. An aqueous solution of

(a) acrylic acid;

(b) cupric acrylate;

(c) methylene bis acrylamide; and

(d) a water-soluble polymerization catalyst which also is a reducing agent;

with the ratio of (a) to (b) being between 10:0.1 to 10:1.5, which solution forms a water resistant gel.

4,173,556

ELASTOPLASTIC COMPOSITIONS OF RUBBER AND POLYAMIDE

Aubert Y. Coran, and Raman P. Patel, both of Akron, Ohio, assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 663,453, Mar. 3, 1976, abandoned. This application Jul. 15, 1977, Ser. No. 816,096

Int. Cl.[2] C08K *5/36;* **C08L** *77/00;* **C08K** *5/49, 5/09*

U.S. Cl. 260—30.8 R **35 Claims**

1. An elastoplastic composition comprising a blend essentially free of low molecular weight phenol plasticizer of (a) thermoplastic crystalline polyamide in an amount sufficient to impart thermoplasticity up to 50 weight percent of the composition, wherein the polyamide in said blend retains at least 50% of its original crystallinity, (b) rubber cross-linked to the extent that the gel content of the rubber is at least about 80 percent, wherein the rubber in said blend is in the form of small dispersed particles essentially of the size of 50 microns or below and is a homopolymer of 1,3-butadiene, copolymer of 1,3-butadiene or isoprene or mixtures thereof, in an amount sufficient to impart rubberlike elasticity up to 80 weight percent of the composition provided that, when the amount of polyamide exceeds the amount of rubber, sufficient inert plasticizer is present to impart rubberlike elasticity to the composition which composition is processable as a thermoplastic and is elastomeric.

4,173,557

INSULATING SEALANT COMPOSITIONS

Lawrence A. Strecker, and Vernon W. Wells, Jr., both of St. Louis, Mo., assignors to Inmont Corporation, New York, N.Y.

Filed Oct. 13, 1978, Ser. No. 951,212

Int. Cl.[2] C08K *5/10*

U.S. Cl. 260—31.8 DR **8 Claims**

1. A pumpable, low viscosity, elastomeric, room temperature curable sealant composition, having good adhesion to glass, aluminum and steel, and providing a moisture barrier seal with good weather properties, said composition comprising (1) a blend of 5 to 95 parts of liquid dibrominated polybutadiene elastomer and 95 to 5 parts of liquid, low molecular weight butyl rubber and (2) a curing agent for each of the elastomers.

4,173,558

NON-AQUEOUS POLYMERIC DISPERSION ALKYL METHACRYLATE COPOLYMERS IN MIXTURES OF ORGANIC SOLVENTS AND GLOSSY COATINGS PRODUCED THEREFROM

Charles K. Beck, Mentor, Ohio, assignor to AM International, Inc., Los Angeles, Calif.

Filed Jun. 30, 1977, Ser. No. 811,523

The portion of the term of this patent subsequent to Apr. 25, 1995, has been disclaimed.

Int. Cl.[2] C08F *2/14;* **C08L** *33/08*

U.S. Cl. 260—33.4 R **13 Claims**

1. A chemically stable non-aqueous dispersion which has the property of drying to a clear, glossy finish upon application to a surface which comprises a copolymer consisting of alkyl methacrylates and a mixture of organic liquids, one of which is an alcohol, said copolymer being the disperse phase and said organic liquid constituting the continuous phase of the non-aqueous dispersion, said mixture including substantially no solvent, and no other dispersant, for said copolymer.

4,173,559

NON-AQUEOUS POLYMERIC DISPERSION OF ALKYL METHACRYLATE AND ALKYL ACRYLATE COPOLYMERS IN MIXTURES OF CYCLOHEXANE AND ALCOHOLS AND MATTE COATINGS PRODUCED THEREFROM

Charles K. Beck, Mentor, Ohio, assignor to AM International, Inc., Los Angeles, Calif.

Filed Jun. 30, 1977, Ser. No. 811,524

The portion of the term of this patent subsequent to Apr. 25, 1995, has been disclaimed.

Int. Cl.[2] C08F *2/14;* **C08L** *33/08*

U.S. Cl. 260—33.4 R **15 Claims**

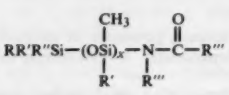
1. A chemically stable non-aqueous dispersion which has the property of drying to a uniform matte finish upon application to a surface which comprises a copolymer consisting of an alkyl methacrylate and an alkyl acrylate and a mixture of organic liquids including cyclohexane and an alcohol, said copolymer being the disperse phase and said mixture of organic liquids constituting the continuous phase of the non-aqueous dispersion, said mixture including substantially no solvent for said copolymer.

4,173,560
TREATMENT OF REINFORCING SILICAS WITH AMIDOSILOXANES

Gary R. Homan, Midland; Myron T. Maxson, Sanford, both of Mich., and Louis H. Toporcer, Twinsburg, Ohio, assignors to Dow Corning Corporation, Midland, Mich.

Filed May 8, 1978, Ser. No. 904,048
Int. Cl.[2] C08L *83/04*
U.S. Cl. 260—37 SB **31 Claims**

1. A treated silica consisting essentially of a finely divided silica with a surface area of at least 50 square meters per gram, said silica having been mixed with treating agent consisting essentially of an amido-siloxane of the formula



where R is a methyl, ethyl, or phenyl radical; R′ is a methyl, ethyl, or 2-(perfluoroalkyl)ethyl radical in which the perfluoroalkyl radical contains 1 to 4 inclusive carbon atoms; R″ is a methyl or vinyl radical; R‴ is a methyl or ethyl radical; and x is an integer of from 3 to 20 inclusive.

5. A silicone elastomer base comprising a fluid and treated silica of claim 1, in which there is present 100 parts by weight fluid for each 5 to 100 parts by weight of treated silica, the fluid being a triorganosiloxy end-blocked polydiorganosiloxane wherein each organic radical is selected from a group consisting of methyl, ethyl, vinyl, phenyl, and 2-(perfluoroalkyl)ethyl in which the perfluoroalkyl radical contains 1 to 4 inclusive carbon atoms, there being an average of two vinyl radicals per siloxane molecule and one vinyl radical bonded to any one silicon atom, there being from 0 to 50 inclusive percent 2-(perfluoroalkyl)ethyl radicals based on the total number of organic radicals in the siloxane and from 0 to 30 inclusive percent phenyl radicals being based on the total number of organic radicals in the siloxane.

4,173,561
FLAME RETARDANT POLYMER COMPOSITION

Minoru Tabana, Suita; Noriyuki Sekine; Tatsuyuki Mitsuno, both of Toyonaka, and Akira Kinoshita, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jan. 4, 1978, Ser. No. 866,905
Claims priority, application Japan, Jan. 12, 1977, 52/2653; Jan. 13, 1977, 52/3111
Int. Cl.[2] C08K *5/34, 5/13, 5/06*
U.S. Cl. 260—45.75 B **8 Claims**

1. A resin composition comprising

(1) a styrene resin selected from the group consisting of polystyrene, rubber-modified polystyrene, polymethyl styrene, styrene-butadiene copolymers, styrene-acrylonitrile copolymers and styrene-butadiene-acrylonitrile terpolymers,

(2) 3 to 40 parts by weight based on 100 parts by weight of the styrene resin of a halogen-containing flame retarder selected from the group consisting of tetrabromobisphenol A, tetrabromophthalic anhydride, hexabromobenzene, pentabromotoluene, pentabromophenol, tris(2,3-dibromopropyl)phosphate, tris(2-chloro-3-bromopropyl)-phosphate, tribromophenyl allyl ether, tribromophenyl 2,3-dibromopropyl ether, tribromophenyl 1,3-dibromoisobutyl ether, octabromodiphenyl ether, decabromodiphenyl ether, octabromobiphenyl, pentachloropentacyclodecane and hexabromocyclododecane, and

(3) as an inorganic compound 0.1 to 10 parts by weight based on 100 parts by weight of the syrene resin of (a) at least one inorganic hydrate compound selected from alumina hydrate and talc, or (b) at least one magnesium compound selected from magnesium hydroxide, magnesium oxide and basic magnesium carbonate,

provided that the halogen-containing flame retarder is decabromodiphenyl ether in an amount of 11 to 30 parts by weight based on 100 parts by weight of the styrene resin when the inorganic compound is the magnesium compound.

4,173,562
PROCESS FOR THE PREPARATION OF α-L-ASPARTYL-L-PHENYLALANINE METHYL ESTER

Gerald L. Bachman, and Billy D. Vineyard, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 754,297, Dec. 27, 1976, abandoned. This application Mar. 31, 1978, Ser. No. 892,358
Int. Cl.[2] C07C *103/52*
U.S. Cl. 260—112.5 R **9 Claims**

1. A process comprising contacting α-L-aspartyl-L-phenylalanine with a reaction medium comprising from about 0.1 to about 0.8 mole hydrogen halide per 100 grams of reaction medium and from about 0.1 to about 1.1 moles methanol per 100 grams of reaction medium and water to form a solid hydrogen halide salt of α-L-aspartyl-L-phenylalanine methyl ester.

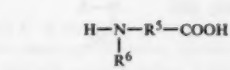
4,173,563
PHOSPHONIUM SALT AND ITS USE

Noboru Yamazaki, and Fukuji Higashi, both of Tokyo, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 815,242, Jul. 13, 1977, Pat. No. 4,120,853, which is a division of Ser. No. 688,289, May 20, 1976, Pat. No. 4,059,603, which is a division of Ser. No. 475,877, Jun. 3, 1974, Pat. No. 3,974,219, which is a continuation-in-part of Ser. No. 305,256, Nov. 10, 1972, abandoned. This application Jun. 12, 1978, Ser. No. 914,773
Claims priority, application Japan, Nov. 22, 1971, 56/93872
Int. Cl.[2] C07C *103/52*; C07G *7/00*
U.S. Cl. 260—112.5 R **4 Claims**

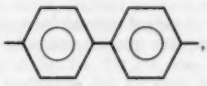
1. A process for producing a peptide which comprises:

reacting the carboxyl group of an amino acid of the formula,

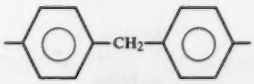


(IV)

having a protected amino group, wherein R^5 is alkylene or alkylidene having 1–30 carbon atoms which may have a substituent selected from the group consisting of phenyl, salicyl, carbamoyl and carboxyl, cycloalkylene or cycloalkylidene having 3–8 carbon atoms, phenylene, a group of the formula



a group of the formula



or a group in which two or more groups selected from the group consisting of the above-mentioned aliphatic and aromatic hydrocarbon groups are bonded through —CONH—; and R^6 is hydrogen or alkyl having 1–4 carbon atoms, with a phosphonium salt obtained by reacting a phosphorous ester selected from the group consisting of monomethyl, monoethyl,

monoisopropyl, monophenyl, dimethyl, diethyl, diisopropyl, di-n-butyl, diphenyl, triethyl, triisopropyl and tributyl esters of phosphorous acid, and an ammonium salt of the phosphorous monoester, with an organic base selected from the group consisting of pyridine, 2-methylpyridine, 3-methylpyridine, 4-methylpyridine, 2,6-dimethylpyridine and triethylamine, and an oxidizing agent selected from the group consisting of bromine, iodine, mercurous chloride, mercuric chloride, mercuric bromide and mercuric acetate, at a temperature of from 30° to 200° C., and then reacting the activated amino acid with an amino acid having a protected carboxyl group or with a free amino acid at a temperature of from 0° to 200° C.

4,173,564

4-N-ACYLFORTIMICIN B DERIVATIVES AND THE CHEMICAL CONVERSION OF FORTIMICIN B TO FORTIMICIN A

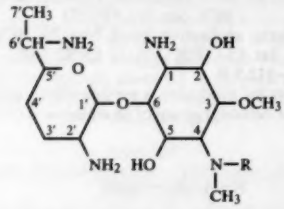
John S. Tadanier; Jerry R. Martin, and Paul Kurath, all of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 888,085, Mar. 20, 1978, which is a division of Ser. No. 725,829, Sep. 23, 1976, Pat. No. 4,091,032. This application Nov. 1, 1978, Ser. No. 956,751

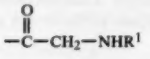
Int. Cl.[2] **C07C** *103/52;* **C07D** *309/22;* **A61K** *37/00*

U.S. Cl. 260—112.5 R **17 Claims**

1. A compound of the formula



wherein R is acyl, aminoacyl, N-monoloweralkylaminoacyl, N,N-diloweralkylaminoacyl, hydroxy-substituted aminoacyl, or substituted aminoacyl of the formula



where R^1 is an acyl radical derived from an amino acid or a short peptide, and the pharmaceutically acceptable salts thereof.

4,173,565

RUBINE DISAZO ACID DYES FOR POLYAMIDES

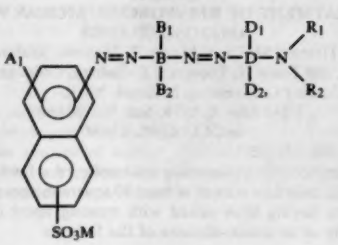
Hans A. Stingl, Toms River, N.J., assignor to Toms River Chemical Corporation, Toms River, N.J.

Filed Dec. 23, 1977, Ser. No. 864,034

Int. Cl.[2] **C09B** *31/04, 31/06, 31/08*

U.S. Cl. 260—191 **6 Claims**

1. A dyestuff of the formula



wherein

M is hydrogen, lithium, sodium, potassium or ammonium;

B and D are each independently 1,4-phenylene or 1,4-naphthylene;

A_1 is hydrogen, C_{1-4} alkoxy, C_{1-4} alkyl, trifluoromethyl, nitro, chloro, bromo, cyano or hydroxy;

B_1 and B_2 are each hydrogen, C_{1-3} alkoxy, C_{1-3} alkyl, chloro or bromo;

D_1 is hydrogen, C_{1-4} alkoxy, C_{1-4} alkyl or chloro;

D_2 is hydrogen, C_{1-4} alkoxy, C_{1-4} alkyl, chloro, bromo, fluoro, C_{1-5} alkanoylamino, C_{1-5} alkylsulfonylamino, benzoylamino, or benzenesulfonylamino, the acylamino groups either unsubstituted or substituted with 1 to 3 C_{1-2} alkyl, C_{1-2} alkoxy, chloro, bromo, cyano, or hydroxy; and

R_1 and R_2 are each C_{1-6} alkyl, C_{1-6} chloro or bromoalkyl, C_{2-6} hydroxy or dihydroxyalkyl, C_{2-6} alkoxyalkyl, C_{1-6} cyanoalkyl or phenyl-C_{1-2} alkyl unsubstituted or substituted on the phenyl with 1 to 3 of C_{1-2} alkyl, C_{1-2} alkoxy, chloro, bromo, cyano, or hydroxy.

4,173,566

1-BENZHYDRYL-2-CYANOAZETIDINE

Elijah H. Gold, West Orange, and Daniel M. Solomon, Edison, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 819,730, Jul. 28, 1977, which is a division of Ser. No. 664,607, Mar. 8, 1976, Pat. No. 4,052,383, which is a continuation-in-part of Ser. No. 519,396, Oct. 30, 1974, abandoned. This application Aug. 23, 1978, Ser. No. 936,293

Claims priority, application Switzerland, Oct. 24, 1975, 13915/75

Int. Cl.[2] **C07D** *205/04;* **A61K** *31/33*

U.S. Cl. 260—239 A **1 Claim**

1. 1-benzhydryl-2-cyanoazetidine.

4,173,567

ISOCYANATE DERIVATIVES OF 1,3[OXAZOLES, OXAZINES, DIAZOLES AND DIAZINES]

Kurt Findeisen; Kuno Wagner, and Walter Uerdingen, all of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

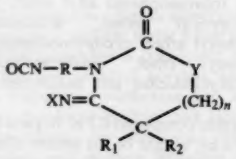
Filed Feb. 10, 1976, Ser. No. 656,909

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1975, 2507682

Int. Cl.[2] **C07D** *233/70, 239/22, 263/38, 265/06*

U.S. Cl. 548—216 **4 Claims**

1. Isocyanates corresponding to the formula



in which

R represents a substituted or unsubstituted aliphatic hydrocarbon group having 2 to 12 carbon atoms, a substituted or unsubstituted cycloaliphatic hydrocarbon group having 4 to 15 carbon atoms, a substituted or unsubstituted aromatic hydrocarbon group having 6 to 15 carbon atoms or a substituted or unsubstituted araliphatic hydrocarbon group having 7 to 15 carbon atoms, said hydrocarbon group having at most three substituents selected from the group consisting of halogen, C_1–C_4-alkyl, methoxy, nitro and C_1–C_4-carbalkoxy groups,

Y represents —O— or —N(R_3)—, where R_3 represents hydrogen, an aliphatic hydrocarbon group having 1 to 4 carbon atoms, a cycloaliphatic hydrocarbon group having 5 to 6 carbon atoms, a phenyl group or —CO—N-H—R—NCO,

n=0 or 1,

R_1 and R_2 are the same or different and represent hydrogen, a substituted or unsubstituted aliphatic hydrocarbon group having 1 to 17 carbon atoms, a substituted or unsubstituted cycloaliphatic hydrocarbon group having 4 to 15 carbon atoms, a substituted or unsubstituted aromatic hydrocarbon group having 6 to 15 carbon atoms or a substituted or unsubstituted araliphatic hydrocarbon group having 7 to 15 carbon atoms, said hydrocarbon group having at most three substituents selected from the group consisting of halogen, C_1–C_4-alkyl, methoxy, nitro and C_1–C_4-carbalkoxy groups or R_1 or R_2 together with the ring carbon atom form a cycloaliphatic ring having 4 to 15 carbon atoms, and

X represents hydrogen or —CO—NH—R—NCO.

4,173,568

PROCESS FOR THE PREPARATION OF COPPER PHTHALOCYANINE

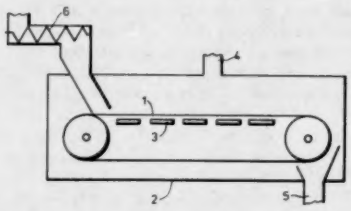
Reinold Schmitz, Odenthal, and Klaus Wunderlich, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 8, 1977, Ser. No. 858,825

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1976, 2657139

Int. Cl.[2] C09B *47/04*

U.S. Cl. 260—314.5 **12 Claims**



1. In the process for preparing copper phthalocyanine by reacting phthalic acid, phthalic anhydride, phthalimide, phthalic acid diamide, ammonium salt of phthalic acid or the corresponding isoindolenines; with urea, biuret, guanidine or cyanuric acid; and with copper salts in the solid state; the improvement comprising heating the components from 30° to 270° C. in a thin layer so that an average rise in temperature of 2° C./minute is not exceeded.

4,173,569

PREPARATION OF PYRROLIDINE AND PYRROLIDIN-2-ONE DERIVATIVES

Silvano Banfi, Paderno Dugnano; Renato Pellegata; Giorgio Pifferi, both of Milan, and Mario Pinza, Corsico, all of Italy, assignors to I.S.F. SpA, Milan, Italy

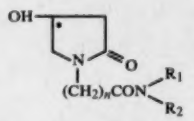
Filed Feb. 8, 1978, Ser. No. 876,169

Claims priority, application Italy, Feb. 11, 1977, 20227 A/77

Int. Cl.[2] C07D *207/26*

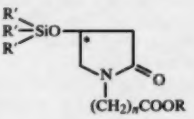
U.S. Cl. 260—326.43 **3 Claims**

1. A process for the preparation of pyrrolidine compounds of the formula:



(I)

in which n is 1, 2 or 3 inclusive, R_1 and R_2, which may be the same or different, are hydrogen or alkyl having 1 to 3 carbon atoms and the asterisk indicates the center of asymmetry of the molecule either as separated enantimoers or as mixture, comprising the steps of (1) reacting γ-amino-β-hydroxybutyric acid in the form of an enantiomer or of a mixture of enantiomers, under anhydrous conditions with a silylating agent, (2) cyclizing the product obtained by heating and (3) then reacting said cyclized product in the presence of an alkaline hydride with an aliphatic acid ester halide of the formula Hal$(CH_2)_n$COOR, in which Hal is bromine, chlorine or iodine, R is alkyl containing 1 to 4 carbon atoms trichlorophenyl, nitrophenyl or trichloroethyl and n has the same meaning as above, to give a silyl compound of the formula:



(II)

in which R′ is methyl or ethyl and n, R and the asterisk have the same meanings as above, (4) then hydrolizing compound (II) to give the corresponding 4-hydroxy compound and (5) reacting said hydroxy compound with a compound of the formula R_1.NH.R_2, in which R_1 and R_2 have the same meanings as above.

4,173,570

PREPARATION OF HALOGENATED ALDEHYDES

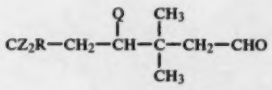
Peter J. V. Cleare, Ascot, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 862,519, Dec. 20, 1977, Pat. No. 4,128,585, which is a division of Ser. No. 737,274, Nov. 1, 1976, Pat. No. 4,085,148. This application Jul. 17, 1978, Ser. No. 925,627

Int. Cl.[2] C07D *317/10*

U.S. Cl. 260—340.9 R **3 Claims**

1. An acetal of a compound of formula:



with a lower aliphatic alcohol containing up to 4 carbon atoms or an alkylene diol containing 2 or 3 carbon atoms, where Q, R and Z are independently selected from chlorine or bromine provided that Q is always bromine when either of R and Z are bromine.

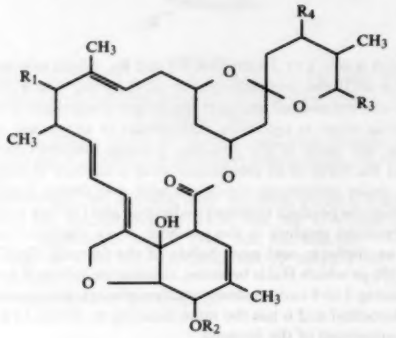
2. 2-(3-Bromo-2,2-dimethyl-5,5,5-trichloropentyl)-1,3-dioxolane.

4,173,571
13-HALO AND 13-DEOXY DERIVATIVES OF C-076 COMPOUNDS

John C. Chabala, Westfield; Michael H. Fisher, Bridgewater, and Helmut H. Mrozik, Matawan, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 19, 1977, Ser. No. 861,919
Int. Cl.[2] C07D *493/22*
U.S. Cl. 260—343.41 **18 Claims**

1. A compound having the formula:



wherein the broken line indicates a single or a double bond;

R_1 is hydrogen or halogen;

R_2 is hydrogen, methyl or loweralkanoyl;

R_3 is n-propyl or sec-butyl; and

R_4 is present only when the broken line indicates a single bond and represents hydrogen, hydroxy, loweralkanoyloxy, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl or loweralkoxy;

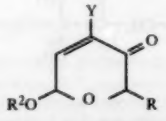
provided that when R_2 is hydrogen or methyl the broken line can indicate only a single bond and R_4 is other than hydroxy.

4,173,572
PREPARATION OF GAMMA-PYRONES FROM 3-SUBSTITUTED FURANS

Thomas M. Brennan, Old Lyme; Daniel P. Brannegan, Pawcatuck; Paul D. Weeks, and Donald E. Kuhla, both of Gales Ferry, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 741,348, Nov. 12, 1976, Pat. No. 4,126,624.
This application Aug. 28, 1978, Ser. No. 937,407
Int. Cl.[2] C07D *309/22*
U.S. Cl. 260—345.9 R **7 Claims**

1. A compound of the formula



wherein R is hydrogen, alkyl of 1 to 4 carbon atoms, phenyl or benzyl; R^2 is hydrogen or alkyl of 1 to 4 carbon atoms; and Y is alkoxyl of 1 to 4 carbon atoms.

4,173,573
PROCESS FOR PREPARING 3,4,3,4-BENZOPHENONE-TETRACARBOXYLIC DIANHYDRIDE

Johann G. D. Schulz, Pittsburgh, and Anatoli Onopchenko, Monroeville, both of Pa., assignors to Gulf Research and Development Company, Pittsburgh, Pa.

Filed Jul. 3, 1978, Ser. No. 921,571
Int. Cl.[2] C07D *307/89*
U.S. Cl. 260—346.4 **9 Claims**

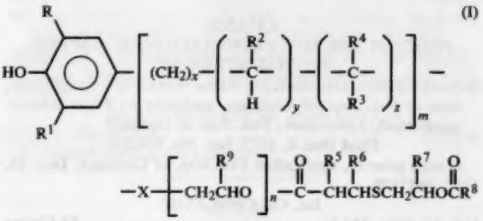
1. A process for preparing 3,4,3',4'-benzophenone-tetracarboxylic dianhydride which comprises condensing an impure ortho-xylene mixture, said impure ortho-xylene mixture containing at least one of meta-xylene, para-xylene, ethylbenzene and cumene, with acetaldehyde in contact with an acid catalyst to obtain an impure 1,1-bis(3,4-dimethylphenyl) ethane mixture, oxidizing the mixture with nitric acid to obtain a mixture of carboxylic acids, from which by crystallization and dehydration, substantially pure 3,4,3',4'-benzophenonetetracarboxylic dianhydride is recovered.

4,173,574
3,5-DITERTIARY ALKYL-4-HYDROXYPHENYL (ALKYL) 6-ACYLOXY-4-THIA HEXANOATES AND HEXENAMIDES AS ANTIOXIDANTS

Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 739,687, Nov. 8, 1976, Pat. No. 4,093,591.
This application Oct. 11, 1977, Ser. No. 841,239
Int. Cl.[2] C08H *3/00*; C08K *9/00*; C08L *00/00*
U.S. Cl. 260—399 **3 Claims**

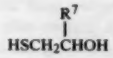
1. A process for making compounds having the following structural formula:



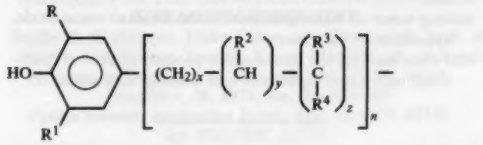
(I)

wherein R and R^1 are radicals selected from the group consisting of tert. alkyl radicals having from 4 to 8 carbons, and cycloalkyl radicals having from 5 to 12 carbons; R^2 and R^3 are selected from the group consisting of H, and alkyl radicals having from 1 to 4 carbons; R^4, R^5, R^6, R^7 and R^9 are selected from the group consisting of H and alkyl radicals having from 1 to 4 carbons; R^8 is selected from the group consisting of alkyl radicals having from 1 to 20 carbons, alkenyl radicals having from 2 to 20 carbons, cycloalkyl radicals having from 5 to 12 carbons, phenyl, substituted phenyl, and aralkyl radicals having from 7 to 12 carbon atoms; x, y or z equals 0 to 12; $x+y+z \leqq 12$; m equals 0 or 1; n equals 0 to 3; an X is 0 or NH; which process comprises:

(a) reacting a β-mercaptoethanol of the structure

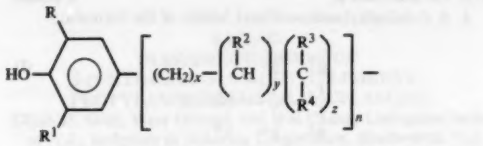


with an unsaturated ester or amide of the structure



in a low boiling polar solvent, in the presence of a catalytic amount of base at a temperature between room temperature and the boiling point of the solvent;

(b) combining an acid chloride or anhydride derived from a carboxylic acid of the structure R^8COOH with a solution comprising the reaction product of (a) which is of the structure



an acid acceptor and an aprotic solvent;

(c) maintaining the resulting reaction in (b) at a temperature between 0° C. and the boiling point of the solvent; and

(d) separating the compound of structure (I) above by standard physical unit operations.

4,173,575

POLYMER BOUND (PENTAHAPTOCYCLOPENTADIENYL) BIS CARBONYL RHODIUM HYDROFORMYLATION CATALYST

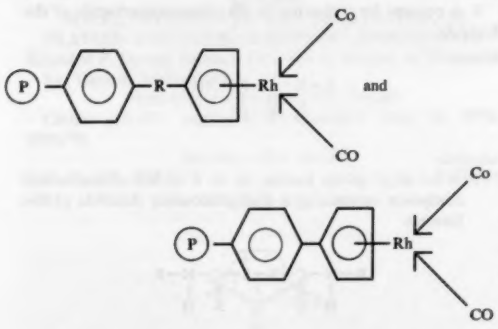
John T. Carlock, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Feb. 13, 1978, Ser. No. 877,440

Int. Cl.[2] C07F *15/00*

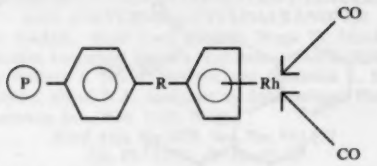
U.S. Cl. 260—429 R **9 Claims**

1. A catalyst having a structure selected from the group consisting of



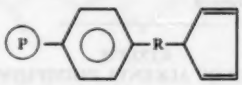
wherein R is an alkyl group containing from 1 to 10 carbon atoms, and (P) represents a polystyrene polymer.

4. A method of preparing a catalyst of the formula



wherein R is an alkyl group containing from 1 to 10 carbon atoms and (P) is a polystyrene polymer backbone, under an inert atmosphere, comprising,

(a) dissolving a compound having the structure



in a suitable solvent, wherein (P) and R have the meaning described above, and reacting with

(b) an alkyl or aryl organolithium material containing from 1–10 carbon atoms, continuing agitation for a period of time sufficient to effect reaction;

(c) filtering the polymer from solution, readding to a suitable solvent, and adding $[Rh(CO)_2X]_2$ wherein X is a halogen; and

(d) continuing stirring for a sufficient time to effect reaction, then removing the catalyst from solution extracting with a suitable solvent, and drying prior to use.

4,173,576

PROCESS FOR THE ESTERIFICATION OF CHLOROSILANES

Claus-Dieter Seiler, Rheinfelden; Hans-Joachim Vahlensieck, Wehr, and Hans-Joachim Kötzsch, Rheinfelden, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Continuation of Ser. No. 707,454, Jul. 21, 1976, abandoned. This application Feb. 28, 1978, Ser. No. 882,000

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1975, 2532887

Int. Cl.[2] C07F *7/18, 7/04, 7/06*

U.S. Cl. 260—448.8 R **12 Claims**

1. In a process for the preparation of an alkoxysilane by the esterification of a chlorosilane with an alcohol of the formula R'OH where R' is an alkyl group of 1 to 11 carbon atoms, the improvement which comprises carrying out the process in the presence of a chlorinated hydrocarbon present in the reaction mixture in an amount of 0.5 to 4 times that of solid halogen silane and in the absence of an acid binding agent.

4,173,577

PHENYLACETOHYDROXAMIC ACIDS

Alfred Sallmann, Bottmingen, and Rudolf Pfister, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

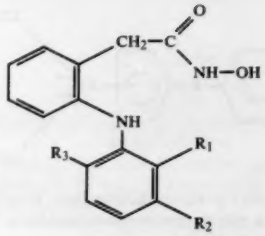
Division of Ser. No. 665,986, Mar. 11, 1976, Pat. No. 4,092,430, which is a continuation of Ser. No. 467,366, May 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 177,088, Sep. 1, 1971, abandoned. This application Feb. 13, 1978, Ser. No. 877,066

Claims priority, application Switzerland, Sep. 9, 1970, 13415/70; Jul. 16, 1971, 10580/71

Int. Cl.[2] C07C *83/10;* A61K *31/185*

U.S. Cl. 260—500.5 H **3 Claims**

1. A compound of the formula



(Ib)

wherein R_1 is methyl or chlorine and each of R_2 and R_3 is hydrogen, methyl or chlorine; or an alkali metal or alkaline earth metal salt thereof.

4,173,578

PRODUCTION OF ALKENYL PHOSPHINIC ACIDS

Horst Staendeke, Erftstadt, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

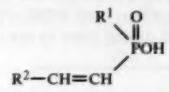
Filed Oct. 11, 1977, Ser. No. 840,908

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1976, 2646582

Int. Cl.[2] C07F *9/30*

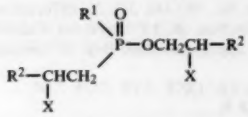
U.S. Cl. 260—502.4 R **6 Claims**

1. A process for making alkenyl phosphinic acids of the general formula



I

in which R^1 stands for an alkyl, aralkyl, cycloalkyl or aryl group having 1 to 20 carbon atoms, and R^2 stands for hydrogen or an alkyl group having 1 to 4 carbon atoms, which comprises subjecting a 2-halogenoalkyl phosphinic acid-2-halogenoalkyl ester of the general formula



II

in which R^1 and R^2 have the meanings given above, and X stands for a halogen atom, to thermal decomposition by heating in a stream of inert gas at temperatures of 150° to 300° C. and simultaneously separating the resulting 1,2-dihalogenoalkane.

4,173,579

CONVERSION OF SULFONATED OLEFINS TO SULFONIC ACID SALTS

Gerhard O. Kuehnhanss, Baton Rouge, La., assignor to Ethyl Corporation, Baton Rouge, La.

Continuation of Ser. No. 445,959, Feb. 26, 1974, abandoned. This application Apr. 1, 1975, Ser. No. 564,095

Int. Cl.[2] C07C *143/16*

U.S. Cl. 260—513 T **15 Claims**

1. A process for converting into sulfonic acid salts the acid mix produced by the sulfonation of olefins having from about 6 to about 30 carbon atoms per molecule with from about 0.5 to about 2.0 mols of SO_3 per mol of olefin which comprises:

reacting the sulfonated olefins with substantially anhydrous alkali metal oxide, hydroxide or carbonate or ammonium carbonate to convert only a portion of the sulfonated molecules including at least the free sulfonic acids into sulfonic acid salts thereby forming an intermediate product,

adding water or water plus ammonium or alkali metal oxide, hydroxide or carbonate,

and then reacting the intermediate product to convert additional sulfonated molecules into sulfonic acid salts.

4,173,580

PRODUCTION OF β-HALOALKYLAMINOSULFONYL HALIDES

Gerhard Hamprecht, Mannheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Fed. Rep. of Germany

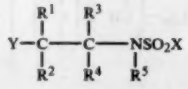
Division of Ser. No. 549,658, Feb. 13, 1975, Pat. No. 4,014,931, which is a continuation-in-part of Ser. No. 431,702, Jan. 8, 1974, Pat. No. 3,919,308. This application Nov. 30, 1976, Ser. No. 746,197

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1974, 2408530

Int. Cl.[2] C07C *143/70*

U.S. Cl. 260—543 R **6 Claims**

1. A β-haloalkylaminosulfonyl halide of the formula:



(I),

in which the individual radicals R^1, R^2, R^3, and R^4 may be identical or different and each is hydrogen, alkyl of 1 to 20 carbon atoms, aralkyl of 7 to 12 carbon atoms, or phenyl, and R^1 and R^3 and/or R^2 and R^4 together with the 2 adjacent carbon atoms may form a five-membered to eight-membered alicyclic ring, Y and X may be identical or different and each is chloro or fluoro and R^5 is alkyloxyalkyl of 2 to 20 carbon atoms.

4,173,581

PROCESS FOR THE PREPARATION OF ALKYLTHIOSEMICARBAZIDES

Karl-Heinz Steinacker, and Gerhard Adolphen, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

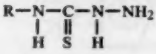
Filed May 9, 1978, Ser. No. 904,346

Claims priority, application Fed. Rep. of Germany, May 23, 1977, 2723121

Int. Cl.[2] C07C *159/00*

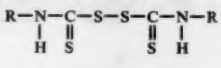
U.S. Cl. 260—552 SC **6 Claims**

1. A process for preparing an alkylthiosemicarbazide of the formula



wherein

R is an alkyl group having up to 4 carbon atoms which comprises contacting a dialkylthiouram disulfide of the formula



wherein

R is an alkyl group having up to 4 carbon atoms with hydrazine in an aqueous medium.

4,173,582

METHOD FOR THE MANUFACTURE OF IMPROVED UREAFORM FERTILIZER

Dahlia S. Greidinger; Liuba Cohen nee Girshowitsh, both of Haifa, and Shimon Epstein, Kiryat Motzkin, all of Israel, assignors to Fertilizers & Chemicals Ltd., Haifa, Israel

Filed Mar. 26, 1976, Ser. No. 670,687
Claims priority, application Israel, Apr. 22, 1975, 47145
Int. Cl.[2] C07C *127/15*
U.S. Cl. 260—553 R 5 Claims

1. A method for the production of ureaform of an improved quality and which has an activity index of greater than 75%, which consists in the condensation of urea and formaldehyde, wherein the overall concentration of the reagents is in the range of 20 to 40% by weight, the reaction being carried out in a controlled system having a pH between 3.5–4.2, at a temperature range of 15° C. up to 40° C. for a time range of about 2–6 hours and subsequently neutralized at the termination of the reaction wherein the molar ratio between urea and formaldehyde is in the range of 1.2 up to but not including 1.5.

4,173,583

DIASTEREOISOMERS OF 5-(1-HYDROXY-2-(1-METHYL-3-PHENYL-PROPYLAMINO)ETHYL)SALICYLAMIDE

Elijah H. Gold, West Orange, and Wei Chang, Livingston, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 569,043, Apr. 17, 1975, abandoned. This application Sep. 21, 1978, Ser. No. 944,505
Int. Cl.[2] C07C *103/26*
U.S. Cl. 260—559 S 11 Claims

1. A process for separating racemic 5-[1-hydroxy-2-(1-methyl-3-phenylpropylamino)ethyl]salicylamide into its diastereoisomers which comprises:

(a) preparing a solution of racemic 5-[1-hydroxy-2-(1-methyl-3-phenylpropylamino)ethyl]salicylamide, a suitable organic sulfonic acid and an alkanoic acid having 1 to 6 carbon atoms in a neutral solvent;

(b) separating diastereoisomer B therefrom in the form of its salt with the sulfonic acid, leaving a mother liquor containing diastereoisomer A; and

(c) adding a mineral acid to the mother liquor whereby diastereoisomer A separates out as its solid salt with that mineral acid;

said diastereoisomer A being characterized as that diastereoisomer whose hydrochloride salt has the higher melting point.

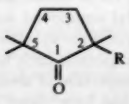
4,173,584

NOVEL CYCLOPENTANONE DERIVATIVES AS FLAVOR- AND ODOR-MODIFYING INGREDIENTS

Khurshid P. Dastur, Satigny, Switzerland, assignor to Firmenich SA, Geneva, Switzerland

Filed May 3, 1977, Ser. No. 793,287
Claims priority, application Switzerland, May 13, 1976, 5995/76
Int. Cl.[2] C07C *49/28*
U.S. Cl. 260—586 R 4 Claims

1.



wherein symbol R represents an alkyl radical comprising from 4 to 6 carbon atoms.

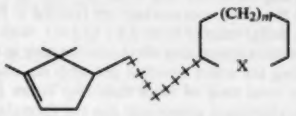
4,173,585

2,2,3-TRIMETHYL-3-CYCLOPENTEN-1-YLALKENYL- AND ALKYLIDENE-CYCLOALKANONES

Takao Yoshida, West Long Branch; Braja D. Mookherjee, Holmdel; Venkatesh Kamath, Red Bank; John B. Hall, Rumson; William I. Taylor, Summit, and Frederick L. Schmitt, Holmdel, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 10, 1978, Ser. No. 932,677
Int. Cl.[2] C07C *49/46, 49/48*
U.S. Cl. 260—586 R 3 Claims

1. A compound having the structure:



wherein m is 0 or 1;
wherein one of the lines ++++ is a carbon-carbon single bond and the other of the lines ++++ is a carbon-carbon double bond and wherein X is carbonyl having the structure:

4,173,586

PROCESS FOR CLEAVAGE OF UNSATURATED MULTI-CYCLIC KETONES

Larry W. Payne, Clute; Howard E. Miller, and James R. Ryffel, both of Lake Jackson, all of Tex., assignors to Badische Corporation, Williamsburg, Va.

Filed Sep. 15, 1978, Ser. No. 942,845
Int. Cl.[2] C07C *27/00, 3/30*
U.S. Cl. 260—586 R 5 Claims

1. A process for thermal cleavage of unsaturated multicyclic ketones selected from the group consisting of 2-(1-cyclohexenyl)cyclohexanone, 2-cyclohexylidenecyclohexanone, and 2-cyclohexenylidenecyclohexanone which comprises confining the ketone in a substantially dry state, without the addition of water or steam, at a temperature from about 150° to 350° C., and under a pressure high enough to ensure that a liquid phase is present, and recovering the products therefrom.

4,173,587

DECOMPOSITION OF CUMENE HYDROPEROXIDE WITH A HETEROGENEOUS CATALYST

Ching-Yong Wu, O'Hara Township, Allegheny County; Wayne R. Pretzer, Oakmont, and Thaddeus P. Kobylinski, Gibsonia, all of Pa., assignors to Gulf Research and Development Company, Pittsburgh, Pa.

Filed Nov. 18, 1977, Ser. No. 852,922
Int. Cl.[2] C07C *49/08, 39/04, 37/08, 45/00*
U.S. Cl. 260—593 A 11 Claims

1. The method for cleaving cumene hydroperoxide at high selectivity to phenol and acetone using a heterogeneous rhenium catalyst which comprises heating a solution comprising about 0.1 to about 20 weight percent cumene hydroperoxide in a solvent in the presence of a rhenium catalyst consisting essentially of a substantially non-soluble rhenium compound selected from unsupported rhenium sulfides, calcined supported rhenium oxides and sulfided supported rhenium oxides wherein said supports are selected from alumina, zirconia and a silica-alumina or a magnesia-alumina having at least about ten weight percent alumina at a temperature between about 10° C. and about 150° C.

4,173,588

MANUFACTURE OF 2-METHYL-2-HEPTEN-6-ONE

Heinrich Pasedach, Ludwigshafen; Rudolf Mohr, Lampertheim, and Axel Nissen, Leimen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

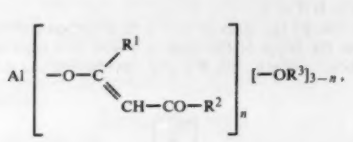
Filed Nov. 3, 1977, Ser. No. 848,211

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1976, 2652863; Jul. 2, 1977, 2729975

Int. Cl.[2] C07C *45/18*

U.S. Cl. 260—595 **8 Claims**

1. In a process for the manufacture of 2-methyl-2-hepten-6-one by reacting 2-methyl-3-buten-2-ol with an alkyl acetoacetate at an elevated temperature in the presence of an organic aluminum compound, the improvement wherein the methylbutenol and the alkyl acetoacetate are reacted at from 140° to 180° C., in a molar ratio of from 0.8:1 to 2.0:1, with the proviso that the concentration of said alkyl acetoacetate in the reaction mixture during the entire reaction period is not above 15% by weight for a total time of more than two hours and wherein said organic aluminum compound has the formula



where R^1 and R^2 are alkyl or alkoxy of 1 to 4 carbon atoms, R^3 is alkyl of 1 to 4 carbon atoms and n is 0, 1, 2 or 3 or said aluminum compound is an aluminum triaryloxylate wherein the aryloxy group is phenolate, optionally substituted by lower alkyl or lower alkoxy of 1 to 4 carbon atoms or is naphtholate, optionally substituted by alkyl or alkoxy of 1 to 4 carbon atoms.

4,173,589

PURIFICATION OF OXO ALDEHYDES

Heinrich Elliehausen, Ludwigshafen; Heinz Hohenschutz, Mannheim; Max Strohmeyer, and Juergen Haug, both of Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 25, 1977, Ser. No. 844,648

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1976, 2650829

Int. Cl.[2] C07C *45/24, 45/08*

U.S. Cl. 260—604 HF **3 Claims**

1. In a process for the purification of oxo aldehydes containing iron pentacarbonyl from the product stream of the manufacture of oxo aldehydes wherein the oxo aldehydes are distilled at normal pressure from the product stream, the improvement comprising:

distilling the oxo aldehydes containing iron pentacarbonyl in the presence of from 0.01 to 0.10 cubic meter (S.T.P.) of added air per g of iron pentacarbonyl to oxidize the iron pentacarbonyl to non-volatile salts, whereby the oxo aldehydes are freed from iron pentacarbonyl.

4,173,590

PROCESS FOR MAKING TETRAMETHYLDIPHOSPHINOMETHANE

Hubert Schmidbaur, Garching, and Hans-Heinz Karsch, Munich, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 20, 1977, Ser. No. 862,523

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1976, 2658127

Int. Cl.[2] C07F *9/50*

U.S. Cl. 260—606.5 P **4 Claims**

1. A process of making tetramethyldiphosphinomethane of the formula $(CH_3)_2P\text{-}CH_2\text{-}P(CH_3)_2$, which comprises: reacting, with agitation, a suspension of dilithiomethane of the formula Li_2CH_2 or magnesiomethane of the formula $MgCH_2$ in an organic solvent with dimethylchlorophosphine and distilling the resulting reaction mixture.

4,173,591

PROCESS FOR THE PREPARATION OF 1,3,5-TRIFLUORO-2,4,6-TRINITROBENZENE

William M. Koppes, Adelphi; Horst G. Adolph, Silver Spring, and Michael E. Sitzmann, Adelphi, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 28, 1978, Ser. No. 937,281

Int. Cl.[2] C07C *79/12*

U.S. Cl. 260—646 **3 Claims**

1. A process for producing 1,3,5-trifluoro-2,4,6-trinitrobenzene comprising the following steps:

(1) forming a mixture of fuming sulfuric acid and potassium nitrate wherein the fuming sulfuric acid is composed of at least 25 percent by weight sulfur trioxide, and wherein the molar ratio of fuming sulfuric acid to potassium nitrate is from about 2:1 to about 3:1;

(2) adding 1,3,5-trifluorobenzene to the mixture until the molar ratio of potassium nitrate to 1,3,5-trifluorobenzene is from 6:1 to 10:1, the temperature of the mixture being maintained in the range of from about 30° C. to about 50° C. during this addition;

(3) then raising the temperature of the mixture into the range of from about 140° C. to about 160° C. where it is maintained until the optimum yield of 1,3,5-trifluoro-2,4,6-trinitrobenzene is obtained; and finally

(4) isolating the product 1,3,5-trifluoro-2,4,6-trinitrobenzene from the reaction mixture.

4,173,592

HEAT-RESISTANT RESIN COMPOSITION

Shuichi Suzuki, Yokohama; Moriyasu Wada, Naka; Sadao Kajiura, Yokohama, and Takeo Ito, Kawasaki, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Apr. 21, 1978, Ser. No. 898,673

Claims priority, application Japan, Apr. 28, 1977, 52/48447

Int. Cl.[2] C08K *5/15*; C08L *63/00, 79/08*

U.S. Cl. 525—134 **11 Claims**

1. A heat resistant resin composition comprising

(A) at least one maleimide compound obtained by reacting a condensation product of aniline, an aromatic hydroxy compound having at least one hydroxyl group directly attached to a carbon atom in the aromatic ring, which may contain at least one hydrocarbon substituent group or at least one non-hydrocarbon substituent group, and formaldehyde with an acid anhydride reactant containing at least 40 mole % of maleic anhydride, the molar ratio of aniline to aromatic hydroxy compound being in the range of 5:95 to 95:5, the ratio of total moles of aniline and aromatic hydroxy compound to moles of formaldehyde being in the range of 10:1 to 1:4, the ratio of amine equivalents to acid equivalents being 1:1 or lower, and

(B) at least one allyl compound selected from the group consisting of polyallyl phenyl ether compounds and polyallyl phenolic compounds each having at least two allyl radicals, in the proportion of about 20 to 95% by weight of compound A and from about 5 to 80% by weight of component B based on the total weight of the composition.

4,173,593
METAL ACETYLACETONATE LATENT ACCELERATORS FOR AN EPOXY-STYRENE RESIN SYSTEM

James D. B. Smith, Wilkins Township, Allegheny County, and Robert N. Kauffman, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 5, 1977, Ser. No. 784,752
Int. Cl.[2] C08L 63/00
U.S. Cl. 525—109 8 Claims

1. A resinous, solventless, low viscosity liquid impregnating composition having fast cure properties, comprising the admixture of:

(A) an epoxy diester, formed from the reaction of:

(I) 1 part of a mixture of a solid 1,2-epoxy resin having an epoxy equivalent weight of between about 390 to 2,500, and a liquid 1,2-epoxy resin having an epoxy equivalent weight of between about 100 to 385, wherein the weight ratio of solid epoxy resin:liquid epoxy resin is between about 1:1 to 1:10, with

(II) between about 0.01 part to about 0.06 part of maleic anhydride and about 0.0001 part to about 0.005 part of a catalyst selected from the group consisting of piperidine, pyridine, imidazoles, and aliphatic tertiary amines, and mixtures thereof; to form an epoxy diester having an acid number between about 0.5 to 3.0; with

(B) between about 0.05 part to about 3.0 parts of a vinyl monomer co-reactive with the epoxy diester; about 0.0003 part to about 0.004 part of a room temperature stabilizer selected from the group consisting of dinitrophenols, trinitrophenols, aromatic quinones, and mixtures thereof; between about 0.3 part to about 1.2 parts of a polycarboxylic anhydride which is soluble in the epoxy diester-vinyl monomer-stabilizer mixture at temperatures of between about 0° C. to 35° C.; and an amount of a free radical catalyst selected from the group consisting of azo compounds, peroxides, and mixtures thereof, that is effective to provide a catalytic curing effect on the mixture at a temperature of over about 85° C.; and

(C) between 0.0005 part to 0.005 part of a metal acetylacetonate, selected from the group consisting of sodium (I) acetylacetonate, zinc (II) acetylacetonate, chromium (III) acetylacetonate, manganese (III) acetylacetonate, ferric (III) acetylacetonate, aluminum (III) acetylacetonate, uranyl (VI) acetylacetonate, and mixtures thereof, acting as the latent accelerator; to provide an epoxy-styrene solventless, liquid impregnating composition, having a viscosity of between about 5 cps to 500 cps at 25° C., and an atmospheric catalyzed pot life at 25° C. of at least 45 days.

4,173,594
THERMOSETTING LACQUER COMPOSITIONS

Zygmunt D. Dyszlewski, Lake City, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Feb. 24, 1975, Ser. No. 552,505
Int. Cl.[2] C08L 63/00
U.S. Cl. 525—498 21 Claims

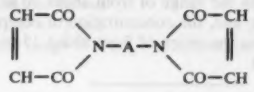
1. Polyurethane-phenolic resin adducts comprising the organic solvent-soluble reaction product formed by contacting a blocked isocyanate-functional polyurethane and an organic solvent-soluble phenolic resin at a temperature sufficient to dissociate said blocked polyurethane and initiate reaction between said polyurethane and said phenolic resin.

4,173,595
THERMOSETTING COMPOSITION FROM BIS-IMIDE, N-VINYL PYRROLIDONE AND UNSATURATED POLYESTER

Max Gruffaz, La Mulatiere, and Jean-Louis Locatelli, Vienne, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Division of Ser. No. 719,282, Aug. 31, 1976, Pat. No. 4,111,919.
This application Jan. 5, 1978, Ser. No. 867,023
Claims priority, application France, Sep. 19, 1975, 75 29460
Int. Cl.[2] C08L 67/06, 79/08
U.S. Cl. 525—165 1 Claim

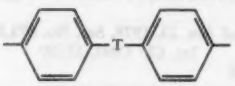
1. A thermosetting composition, characterized in that it consists essentially of, by weight: from 60 to 90% of a bis-maleimide of the formula:



(I)

in which

A represents a divalent radical chosen from the group consisting of phenylene radicals and radicals of the formula:



where

T represents $-CH_2-$, $-C(CH_3)_2-$, $-O-$ or $-SO_2-$; and from 10 to 40% of N-vinylpyrrolid-2-one;

and further modified by the addition of an unsaturated polyester in an amount representing from 5 to 60% of the weight of the mixture of the bis-maleimide and N-vinylpyrrolid-2-one, said unsaturated polyester being derived from at least one polycarboxylic acid derivative and at least one polyol, at least one of which contains olefinic unsaturation, with up to 60% by weight, based on the weight of the polyester composition, of an olefinically unsaturated monomer.

4,173,596
SOFT-SEEDED TOUGHENERS FOR POLYVINYL CHLORIDE

Elmer J. De Witt, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 23, 1977, Ser. No. 863,835
Int. Cl.[2] C08F 279/06
U.S. Cl. 428—402 9 Claims

1. A composition comprising polymer particles prepared by (a) providing a seed latex wherein the polymer particles have an average size in the range of from about 200 to 2000 A and a T_g less than about 20° C., said seed consisting essentially of a polymer derived from an alkyl acrylate monomer and from about 0.1 to about 5 weight percent cross-linking monomer or a copolymer derived from a major amount, by weight, of an alkyl acrylate monomer, a minor amount, by weight, of an addition monomer and from about 0.1 to about 5 weight percent cross-linking monomer, the alkyl moiety of the alkyl acrylate monomer comprising an aliphatic or alicyclic hydrocarbon radical having 3 to 12 carbon atoms and the addition monomer being selected from the group consisting of vinyl, acrylic acid ester and nitrile functional monomers derived from acrylic acid esters; (b) contacting said polymer particles within the latex with butadiene monomer or a monomer mixture containing butadiene and an alkyl acrylate ester or butadiene and an addition monomer under conditions designed for the overpolymerization of said monomers on the polymer particles of the latex to the substantial exclusion of the formation of new polymer particles therefrom; and (c) contacting the

overpolymerized polymer particles of said latex formed in step (b) with a monomer mixture containing an α-aryl substituted monoolefin and an α-alkyl alkylacrylate ester monomer under conditions designed for overpolymerization of said monomers on the polymer particles of the latex to the substantial exclusion of the formation of new polymer particles within said latex;

the relative proportion of structural units in the copolymer component of step (b) being adjusted to insure that such component is elastomeric in nature, and the relative proportion of structural units in the copolymer component of step (c) being adjusted to insure that such component is harder than the component of step (b); and

the relative concentration in the composition of the component of step (a) being in the range of from about 5 to about 20 weight percent; the concentration of the component of step (b) being in the range of from about 50 to about 75 weight percent; and, the concentration of components of step (c) being in the range of from about 15 to about 40 weight percent.

4,173,597
IMPACT STYRENE POLYMER BLENDS WITH THERMOPLASTIC ELASTOMERS

Kenneth W. Willcox, and Fay W. Bailey, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 23, 1978, Ser. No. 871,659
Int. Cl.[2] C08L *53/00*
U.S. Cl. 525—98 **10 Claims**

1. A blend having a polymerized diene content within the range of 18 to 24 weight percent based on a total weight of said blend comprising:

a styrene polymer; and

a thermoplastic elastomer having a melt flow within the range of 2–15 at 180° C. in accordance with ASTM D 1238-65T with a 5 kg weight, said thermoplastic elastomer being a block copolymer of at least one conjugated diene and at least one monovinyl-substituted aromatic compound.

4,173,598
POLYMERIC COMPOSITIONS AND METHODS FOR THEIR PRODUCTION

Garbiel G. M. Castelazo; Abraham Quintero; Alejandro Medina, and Gilberto Fabila, all of Presidente Mazaryk No. 61, Col. Polanco, Mexico (5)

Continuation-in-part of Ser. No. 704,633, Jul. 13, 1976, abandoned. This application Dec. 9, 1977, Ser. No. 859,146
Int. Cl.[2] C08F *279/02*
U.S. Cl. 428—402 **7 Claims**

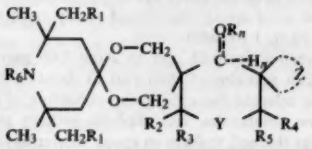
1. A process for making a polymeric composition of matter of the terpolymer type, said process having as its only essential steps the steps of: forming an elastomeric substrate by emulsion copolymerization of from 50–60 percent by weight of a rubber-forming, linear, diene monomer and from 40–50 percent by weight of an aromatic vinyl monomer at a temperature in the range of 65°–85° and in the presence of a free radical catalyst, a C_{10}–C_{18} mercaptan chain transfer agent, and 0.3–1.5% by weight of an aromatic, divinyl, cross-linking agent until a conversion of at least 95 percent is attained; effecting a graft polymerization of at least one of the group consisting of acrylic and methacrylic polymers on said substrate by dosing said substrate simultaneously at a substantially constant rate with a monomeric constituent consisting of at least one C_1–C_3 ester of methacrylic or C_2–C_4 ester of acrylic acid at an ester: substrate ratio of 1:3 to 1:4 and with a chain transfer agent, a catalyst, and a 0.2–0.6% by weight of cross-linking agent, all as aforesaid, the dosing being carried out in emulsion at a temperature in the range of 80° to 95° for a period of 3.5 to 5.5 hours; continuing the reactions for a period of 1 to 2 hours after the dosing is completed; and thereafter recovering the polymer from the emulsion, that being the final step in the making of the composition.

4,173,599
2,2,6,6-TETRAALKYL-4-PIPERIDYL KETONES AND KETALS AS STABILIZERS FOR SYNTHETIC POLYMERS

Motonobu Minagawa, Kosigaya; Naohiro Kubota, and Toshihiro Shibata, both of Urawa, all of Japan, assignors to Argus Chemical Corporation, Brooklyn, N.Y.

Filed Mar. 16, 1978, Ser. No. 886,965
Claims priority, application Japan, Mar. 31, 1977, 52-37051
Int. Cl.[2] C07D *491/10, 491/20;* C08K *5/35*
U.S. Cl. 525—66 **29 Claims**

1. 2,2,6,6-tetraalkyl-4-piperidyl ketones and ketals having the formula:



wherein:

n are each 0 or 1 and are each the same;

R is selected from the group consisting of hydrogen, alkyl having from one to about eighteen carbon atoms, and acyl

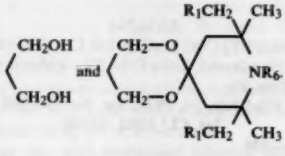
R′ being selected from the group consisting of alkyl and alkenyl having from one to about eighteen carbon atoms, and such radicals containing phenyl, thioalkyl and phenolic groups, pyrrolidonyl and nicotinyl;

R_1, R_2, R_3, R_4 and R_5 are selected from the group consisting of hydrogen and alkyl having from one to about eighteen carbon atoms;

R_6 is selected from the group consisting of hydrogen and O·;

Y is selected from the group consisting of a carbon-to-carbon bond —, oxy —O—; alkylene having from one to about three carbon atoms, and alkyl-substituted alkylene, the alkylene having from one to about three carbon atoms, the alkyl having from one to about six carbon atoms; and

Z is selected from the group consisting of:



23. An olefin polymer composition having improved resistance to deterioration comprising an olefin polymer selected from the group consisting of polymers of alpha-olefins having from two to six carbon atoms and polystyrene, and a compound in accordance with claim **1**.

4,173,600

MULTI-STAGE SEQUENTIALLY PRODUCED POLYMER COMPOSITION

Kazuo Kishida; Akira Hasegawa, both of Otake, and Hiroshi Mohri, Yokohama, all of Japan, assignors to Mitsubishi Rayon Co., Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 807,642, Jun. 17, 1977, abandoned. This application Nov. 27, 1978, Ser. No. 963,733
Claims priority, application Japan, Jun. 25, 1976, 51/75302
Int. Cl.[2] C08F *279/02*
U.S. Cl. 525—76 12 Claims

1. A multi-stage sequentially produced polymer structure composition, which comprises:

an innermost layer (A), and successively seed polymerized thereupon an elastic polymer layer (B), an outermost layer (C) and at least one intermediate layer (D);

said layer (A) which has a glass transition temperature (Tg) of at least 10° C. and which constitutes 5–35% by weight of the total polymer composition being the polymerized product of a monomer mixture comprising 51–100 parts by weight of styrene or a styrene derivative, 0–49 parts by weight of a monomer having a copolymerizable double bond, 0–10 parts by weight of a polyfunctional monomer, and 0–5 parts by weight of a graft crosslinking agent;

said layer (B) which has a glass transition temperature of 0° C. or less and which constitutes 5–55% by weight of the total polymer composition being the product, polymerized in the presence of a product containing the previously polymerized stages, of a monomer mixture comprising 60–100 parts by weight of a diene monomer, 0–40 parts by weight of a monomer having a copolymerizable double bond, 0–10 parts by weight of a polyfunctional monomer and 0–5 parts by weight of a graft crosslinking agent;

said layer (C) which has a glass transition temperature of at least 50° C. and which constitutes 10–70% by weight of the total polymer composition being the product, polymerized in the presence of a product containing the previously polymerized stages, of a monomer mixture comprising 51–100 parts by weight of styrene or a styrene derivative and 0–49 parts by weight of a monomer having a copolymerizable double bond; and

said intermediate layer (D) which constitutes 5–45% by weight of the total polymer composition being the product, polymerized in the presence of a product containing the previously polymerized stages, of a monomer mixture comprising 20 to (Y-10) parts by weight of styrene or a styrene derivative, (Y-10) to 20 parts by weight of a diene monomer, 0–10 parts by weight of a polyfunctional monomer and 0–5 parts by weight of a graft crosslinking agent, wherein Y is the amount of diene monomer used in the formation of said layer (B).

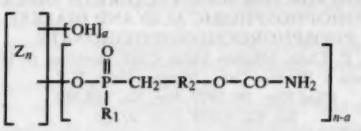
4,173,601

CARBAMOYL-OXYALKYL-PHOSPHINIC ACID DERIVATIVES

Hans-Jerg Kleiner, Kronberg; Fritz Linke, and Walter Dürsch, both of Königstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 8, 1978, Ser. No. 913,548
Claims priority, application Switzerland, Jun. 10, 1977, 7192/77
Int. Cl.[2] C07F *9/32*; C09K *3/28*
U.S. Cl. 260—938 2 Claims

1. Compounds of the formula



I

in which

Z_n is an n-valent, saturated hydrocarbon radical having from 1 to 6 carbon atoms,

R_1 is an optionally branched alkyl group having from 1 to 6 carbon atoms, which alkyl group may be substituted by a halogen atom, preferably chlorine, or a phenyl radical,

R_2 is an optionally branched alkylene group having from 2 to 7 carbon atoms,

a is zero to n−1 and

n is in the range of from 1 to 4; and the mixtures thereof.

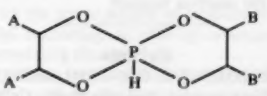
4,173,602

PROCESS FOR PREPARING SPIROCYCLIC PHOSPHORUS COMPOUNDS

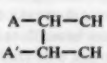
Curtis P. Smith, Cheshire, and Henri Ulrich, Northford, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 786,690, Apr. 11, 1977, Pat. No. 4,113,014, which is a continuation of Ser. No. 634,136, Nov. 21, 1975, abandoned. This application Jun. 28, 1978, Ser. No. 922,335
Int. Cl.[2] C07F *9/08*
U.S. Cl. 260—971 3 Claims

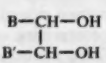
1. A process for the preparation of a spirocyclic phosphorus compound of the formula:



wherein A, A′, B and B′ are each independently selected from the class consisting of hydrogen and lower-alkyl, which comprises admixing substantially equimolar proportions of phosphorus trichloride and a diol



wherein A and A′ are as above defined, at a temperature within the range of 0° C. to 15° C., maintaining the resulting reaction product at a temperature within the same range while adding at least an equimolar proportion of propylene oxide thereto, and, finally, maintaining the product so obtained at a temperature range of about 25° C. to about 40° C. while adding an equimolar proportion of a second diol



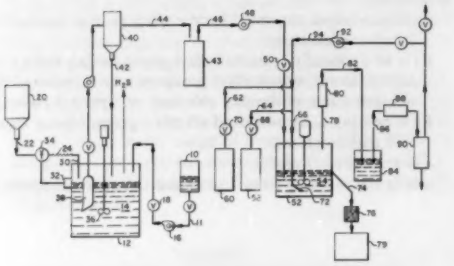
wherein B and B′ are as above defined.

4,173,603

METHOD FOR THE MANUFACTURE OF DIALKYL DITHIOPHOSPHORIC ACID AND DIALKYL PHOSPHOROCHLORIDOTHIONATE

Joseph L. P. Chen, Mission Viejo, Calif., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Filed Dec. 29, 1977, Ser. No. 865,565
Int. Cl.[2] C07F *9/20, 9/165*
U.S. Cl. 260—986 **15 Claims**



1. A continuous process for manufacturing dialkyl phosphorochloridothionate which comprises:

(a) continuously reacting a liquid lower alkyl alcohol with solid phosphorus pentasulfide slurried in dialkyl dithiophosphoric acid;

(b) partially immersing a settling tube having an inclined inner surface in said slurry to separate dialkyl dithiophosphoric acid product from a major portion of slurried phosphorus pentasulfide;

(c) removing said separated dialkyl dithiophosphoric acid product from a top portion of said settling tube at a fluid velocity at least as slow as the settling velocity of a major portion of said slurried phosphorus pentasulfide;

(d) continuously reacting said removed dialkyl dithiophosphoric acid with chlorine in a single step operation by contacting said removed dialkyl dithiophosphoric acid with chlorine at a temperature of from 0° to about 75° C., said chlorine having been diluted with an inert gas; and

(e) separating the resulting dialkyl phosphorochloridothionate from the reaction mixture.

4,173,604

ENVIRONMENTAL CONTROL DISPENSER

Dimitrios A. Dimacopoulos, Redondo Beach, Calif., assignor to Cline-Buckner, Inc., Cerritos, Calif.

Filed Feb. 9, 1978, Ser. No. 876,322
Int. Cl.[2] F02M *37/00*
U.S. Cl. 261—30 **21 Claims**

1. A vapor generator which comprises:

closed receptacle means having an openable top portion.

capillary action diaphragm means in the upper portion of said receptacle means beneath said openable top portion and adapted to have one side thereof exposed upon opening of said top portion,

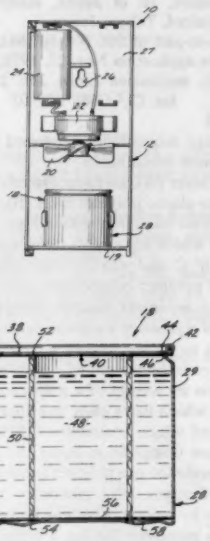
vaporizable liquid concentrate in said receptacle means below said diaphragm means, and

liquid transport means in said receptacle means below said diaphragm means, said transport means engaging said diaphragm means and extending downwardly therefrom into said liquid concentrate,

said transport means being adapted to transport said liquid concentrate to said diaphragm means for vaporization thereof from said exposed side of said diaphragm means,

said receptacle means comprising a can having a lid with a peripheral scare defining a removable central portion and a peripheral portion which remains after removal of said central portion,

said diaphragm means extending across the aperture remaining in said lid after removal of said central portion, and



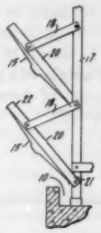
said diaphragm means having a peripheral portion which is supported in said can beneath said peripheral portion of said lid.

4,173,605

LIQUID COOLING TOWER

Robert Long, Santa Rosa, Calif., assignor to Ecodyne Corporation, Lincolnshire, Ill.

Filed Sep. 5, 1978, Ser. No. 939,759
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—109 **29 Claims**



1. A liquid cooling tower having means for delivering liquid and for causing such liquid to fall within said tower, an air inlet, an air outlet, means for causing air to flow from said inlet to said outlet so as to intersect the liquid falling within the tower, and an improved louver assembly at said inlet comprising:

A. a plurality of horizontally spaced, generally vertically extending louver support columns;

B. a plurality of louver support arms spaced vertically along said columns, said arms extending transversely from said columns;

C. a plurality of louver support brackets, each bracket having an upper portion connected to an arm and a lower portion connected to a column;

D. a plurality of louver panels, the outer edges of each panel defining a generally rectangular outline with one pair of parallel edge portions being attached to said louver support brackets, and the other pair of parallel edge portions being oriented generally horizontally, said one pair of edge portions being substantially flat and lying in a single plane and the entire body of said panel extending between said pairs of edge portions lying outside of said single plane.

4,173,606

METHOD OF MANUFACTURING SHAPED ARTICLES FROM CRYSTALLINE ACRYLONITRILE POLYMERS AND COPOLYMERS

Vladimír Stoy; Artur Stoy; Jiří Zíma, and Jaroslav Kálal, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved., Prague, Czechoslovakia

Continuation of Ser. No. 702,573, Jul. 6, 1976, abandoned. This application Apr. 11, 1978, Ser. No. 895,366

Claims priority, application Czechoslovakia, Jul. 14, 1975, 4957/75

Int. Cl.[2] B29D *11/00;* **B29C** *25/00*

U.S. Cl. 264—1 **4 Claims**

1. Method of manufacturing shaped water-insoluble hydrogel articles of the type comprising plates, filaments, hollow filaments, contact lenses, catheters, intubation tubes and dialysation membranes from crystalline acrylonitrile homopolymers and copolymers, consisting of the steps of:

(1) Shaping a solution of a crystalline acrylonitrile homopolymer or copolymer in a mixture containing 50 to 99.5% by weight of a solvent and 0.5 to 50% by weight of a non-solvent, to the desired final shape;

(2) Cooling the shaped solution to a temperature below the gelation point of the solution until the solution gelates without changing its composition and shape to form a shaped thermoreversible gel; and

(3) Removing the solvent from the shaped thermoreversible gel by means of water at temperatures lower than the gelation point of the solution, whereby a shaped article having the shape established in step (1) is obtained.

4,173,607

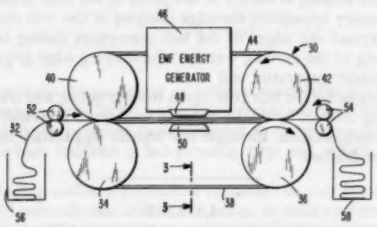
METHOD FOR TEXTURING THE SURFACE OF NON-WOVEN FABRIC FILMS

Karl E. Bahr, Meadville, Pa., assignor to Textron Inc., Providence, R.I.

Filed Jun. 9, 1977, Ser. No. 805,175

Int. Cl.[2] H05B *5/00, 9/00*

U.S. Cl. 264—25 **4 Claims**



1. A method of manufacturing a textured strip of slide fastener chain comprising the steps of

forming a slide fastener chain including a pair of mounting tapes and a pair of interengaged trains of coupling elements secured on inner edges of the respective tapes, each tape being a smooth film strip of the thermoplastic material which includes a susceptor material,

running the slide fastener chain between parallel sections of a pair of endless nonsusceptible mold bands supported by respective pairs of spaced press wheels rotating the pair of mold bands,

compressively engaging the pair of tapes during the running step by means of facing resilient patterned surfaces of the respective endless mold bands,

passing the strip through an electromagnetic field during an intermediate portion of said compressively engaging step to soften the thermoplastic material of the tapes,

venting air between the resilient patterned surfaces and the strip by means of spaced openings through said endless bands during said passing step,

whereby the tapes of the strip are impressed with a pattern from the patterned surfaces, and

receiving the pair of interengaged trains of coupling elements within longitudinal channels formed in the centers of the respective patterned surfaces so that the pair of interengaged trains of coupling elements remained undeformed.

4,173,608

PROCESS AND APPARATUS FOR THE MANUFACTURE OF EXPANDED PLASTICS MATERIALS

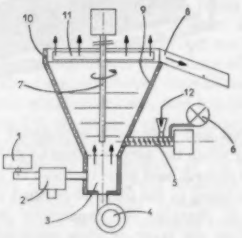
Joël Soulier, Ivry la Bataille, France, assignor to Isobox-Barbier, Bannalex, France

Filed Oct. 5, 1977, Ser. No. 839,453

Claims priority, application France, Oct. 22, 1976, 76 31899

Int. Cl.[2] B29D *27/00;* **H05B** *9/06*

U.S. Cl. 264—26 **10 Claims**



1. A process for the pre-expansion of particles of thermoplastic resin material containing an inflating or expanding agent, said process comprising the steps of:

continuously mixing small particles of said thermoplastic resin material with a polar liquid;

continuously introducing said mixture into a resonant chamber communicating with a source of ultra-high frequency electro-magnetic or microwave energy;

introducing said ultra-high frequency electro-magnetic microwave energy into said resonant chamber to vaporize said polar liquid on said plastic particles whereby said particles are caused to expand;

introducing hot air into said chamber to pulse or agitate said vapor whereby condensation of said vapor on said pre-expanded particles is prevented and said particles are dried; and

extracting said dried pre-expanded particles from said resonant chamber.

4,173,609

METHOD OF MANUFACTURING BUILDING ELEMENTS FROM SO-CALLED FOAMED CERAMICS

Carl B. A. Engström, Uttran, Sweden, assignor to Euroc Development AB, Malmo, Sweden

Filed Jun. 10, 1977, Ser. No. 805,484

Claims priority, application Sweden, Jun. 10, 1976, 7606609

Int. Cl.[2] C04B *21/02, 33/34*

U.S. Cl. 264—43 **7 Claims**

1. In the method of manufacturing a block-like foamed ce-

ramic building element in a mould of refractory material which comprises:

(a) coating at least the bottom surface of the mould with a layer of a glass material or a glass-forming composition having a melting point of 800°–1000° C. and being non-expandable when heated,

(b) charging an expandable ceramic composition into the mould, said expandable ceramic composition being capable of forming a foamed ceramic when heated to a temperature between 800° and 1100° C.,

(c) heating the mould and its contents to temperatures between 800° and 1000° C. for a period of time sufficient for the foamed ceramic and the glass to fuse together at their interface,

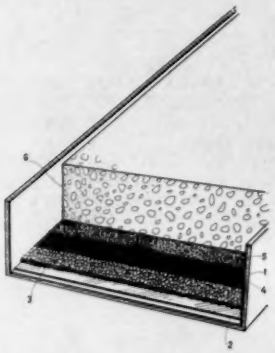
the improvement which comprises

(1) said glass material or glass-forming composition being uncolored and free from substances which will cause coloring when the glass material or glass-forming composition is melted, said glass material or glass-forming composition being in the form of crushed particles, and

(2) prior to charging the expandable mass to the mould placing on the layer of glass material or glass forming compositions a carrier sheet, said carrier sheet being composed of meltable or destructible material, carrying a layer of pigmented color glazing material,

(3) said heating of the mould being carried out under oxidizing conditions to foam the ceramic and to fuse together the glass,

whereby, after the expandable mass has expanded and the glass material or the glass-forming composition has been sintered and said carrier sheet has been melted or destroyed, the pigmented glaze layer appears as a colored background through the uncolored sintered glass layer.



4,173,610
PROCESS FOR THE MANUFACTURE OF LUMP CALCIUM SULFATE

Rolf Huller, Iphofen; Alfons Knauf, Siersburg, and Franz Wirsching, Iphofen, all of Fed. Rep. of Germany, assignors to Gebr. Knauf Westdeutsche Gipswerke, Fed. Rep. of Germany

Filed Dec. 20, 1977, Ser. No. 862,605

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1976, 2658915

Int. Cl.[2] B01J *2/22*

U.S. Cl. 264—28 **4 Claims**

1. A process for the manufacture of calcium sulfate pellets from finely divided natural or synthetic calcium sulfate, which comprises:

adjusting the free water content of the finely divided calcium sulfate to a value of from about 0.5 to about 4 percent by weight; and

pressing the resultant finely divided calcium sulfate by means of a roll press using a surface pressure of from about 1 to about 5 Mp per cm of roller length,

said pressing step being performed at a temperature between about 0° and about 60° C.

4,173,611
PROCESS FOR FEEDING A MOVING WEB TO A STENTER APPARATUS

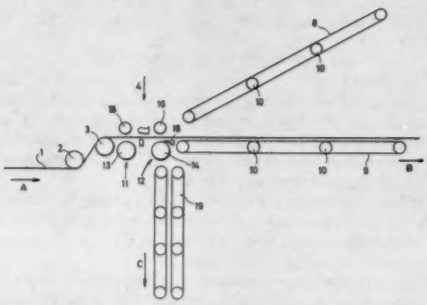
Nigel C. Benson, Ickleford; John M. F. Hughes; Denis Kingslake, both of Stevenage, and David G. Symonds, Hatfield, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jul. 15, 1977, Ser. No. 816,192

Claims priority, application United Kingdom, Apr. 5, 1977, 14315/77

Int. Cl.[2] B29B *5/04;* **B65H** *17/18*

U.S. Cl. 264—138 **7 Claims**



1. A process for initially introducing a moving web into a stenter apparatus which includes linearly moving edge grips, utilizing at least one belt conveyor located on one side of the moving web and at least one other belt conveyor located on the other side of the moving web, the process comprising the steps of

gripping and transporting the web between the at least one belt conveyor and the at least one other belt conveyor,

driving the belt conveyors at a linear speed substantially equal to the linear speed of the stenter apparatus edge grips,

transferring the moving web into the moving edge grips of the stenter apparatus,

said gripping and transporting step being accomplished by extending the belt conveyors into the stenter apparatus and located inwardly of the paths of the edge grips of the stenter apparatus, the edge margins of the web extending beyond the edges of the belt conveyors during transferring of the moving web into the moving edge grips of the stenter apparatus; and

disengaging the belt conveyors from gripping and transporting contact with the moving web once continuous web transportation through the stenter apparatus has been established.

4,173,612
EXTRUSION PROCESS FOR THERMOPLASTIC RUBBER FILM

William G. F. Kelly, Cornelia, Ga., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Nov. 3, 1977, Ser. No. 848,439

Int. Cl.[2] B28B *3/20*

U.S. Cl. 264—176 R **5 Claims**

1. In a process for producing thermoplastic rubber film by extruding thermoplastic rubber into a thin film, the improvement which comprises employing as the thermoplastic rubber a mixture of thermoplastic rubber and sufficient amorphous

polypropylene to improve the processability of said thermoplastic rubber as evidenced by the ability to achieve a draw ratio while extruding said mixture of at least 1.

4,173,613

PROCESS FOR PRODUCING CELLULOSIC SHAPED ARTICLES

Henry Rodier, Sainte-Foy-Les-Lyon, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Jul. 14, 1977, Ser. No. 815,850
Claims priority, application France, Jul. 16, 1976, 76 22032
Int. Cl.[2] C08L *1/24*
U.S. Cl. 264—187 **11 Claims**

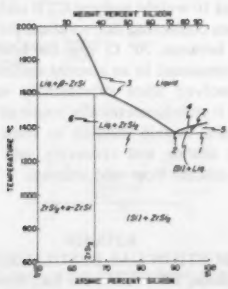
1. Process for producing shaped articles of cellulose, said process comprising contacting a solution in said shaped form with a coagulant bath containing water, DMSO, and ammonia or an ammonium salt to coagulate said solution therein, the DMSO present in an amount of about 25 to 60 weight percent, based on the amount of DMSO and water, and the ammonia or ammonium salt present in an amount, calculated as ammonia, of at least 1 gram per liter of the mixture of DMSO and water, said solution containing cellulose in dimethylsulphoxide (DMSO) and formaldehyde at a formaldehyde/cellulose weight ratio of about 0.2 to 2 and at a cellulose concentration of at least 6% by weight based on the volume of DMSO.

4,173,614

PROCESS FOR PREPARING A POLYCRYSTALLINE DIAMOND BODY/SILICON NITRIDE SUBSTRATE COMPOSITE

Minyoung Lee, Schenectady; Lawrence E. Szala, Scotia, and Robert C. De Vries, Burnt Hills, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 844,449, Oct. 21, 1977. This application Mar. 22, 1978, Ser. No. 889,107
Int. Cl.[2] B24D *3/08*
U.S. Cl. 264—332 **7 Claims**



1. A process for preparing an integral composite of a polycrystalline diamond body and silicon nitride substrate at pressures substantially below those required by the diamond stable region which includes a hot-pressing step and which comprises:

(a) placing within a protective container or cup a mass of solid eutectiferous silicon-rich alloy, or solid components for providing eutectiferous silicon-rich alloy, a mass of diamond crystals and a polycrystalline silicon nitride substrate, said mass of diamond crystals being intermediate and in contact with said substrate and said mass of solid eutectiferous silicon-rich alloy, or with at least one of said components for providing eutectiferous silicon-rich alloy, said eutectiferous silicon-rich alloy being composed of silicon and a metal which forms a silicide with said silicon and which is selected from the group consisting of cobalt, chromium, iron, hafnium, manganese, molybdenum, nickel, palladium, platinum, rhenium, rhodium, ruthenium, tantalum, thorium, titanium, uranium, vanadium, tungsten, yttrium, zirconium, and alloys thereof;

(b) disposing said container and its contents within a pressure transmitting powder medium that transmits applied pressure substantially undiminished and remains substantially unsintered during said hot-pressing;

(c) applying sufficient substantially isostatic pressure to said container and its contents via said powder medium to substantially stabilize the dimensions of said container and said contents substantially uniformly producing a shaped substantially isostatic system of powder-enveloped container wherein the density of the resulting compressed mass of diamond crystals is higher than 70% by volume of the volume of said compressed diamond crystals;

(d) hot pressing the resulting substantially isostatic system producing fluid infiltrating eutectiferous silicon-rich alloy and infiltrating said fluid eutectiferous silicon-rich alloy through the interstices of said compressed mass of diamond crystals and into contact with the contacting surface of said substrate which forms an interface with said compressed mass of crystals, said hot-pressing being carried out at an hot-pressing temperature below 1600° C. under a hot-pressing pressure sufficient to infiltrate said fluid silicon-rich alloy throughout the interstices of said compressed mass of diamond crystals, said solid eutectiferous silicon-rich alloy, or solid components for eutectiferous silicon-rich alloy being used in an amount sufficient to produce sufficient fluid eutectiferous silicon-rich alloy at said hot-pressing temperature to fill the interstices of said compressed mass of diamond crystals and contact the contacting surface of said substrate filling the pores through the interface so that it is at least substantially pore-free, said hot-pressing being carried out in an atmosphere which has no significant deleterious effect on said diamond crystals or said infiltrating fluid silicon-rich alloy or on said silicon nitride substrate, said hot-pressing converting less than 5% by volume of said diamond crystals to non-diamond elemental carbon, said infiltrating silicon-rich alloy encapsulating the surfaces of the compressed diamond crystals reacting with the diamond surfaces or non-diamond elemental carbon producing a carbide which at least in major amount is silicon carbide;

(e) maintaining sufficient pressure on the resulting hot-pressed substantially isostatic system during cooling thereof to at least substantially maintain the dimensions of said hot-pressed system; and

(f) recovering the resulting composite of polycrystalline diamond body bonded to silicon nitride substrate wherein the diamond crystals are present in an amount from at least 70% by volume up to about but less than 90% by volume of said polycrystalline diamond body, said diamond body being at least substantially pore-free and being free of elemental non-diamond carbon phase in that it does not contain non-diamond elemental carbon phase in an amount detectable by X-ray diffraction analysis.

4,173,615

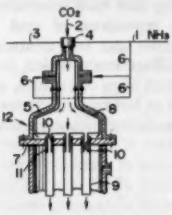
CHEMICAL APPARATUS FOR CORROSIVE MATERIALS

Eiji Otsuka, Yokohama; Shigeru Inoue; Tetsuo Kimura, both of Kamakura; Toshinori Takae, Tokyo; Morio Tsuji, and Toshiki Kato, both of Osaka, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Division of Ser. No. 591,285, Jun. 30, 1975. This application Jun. 24, 1977, Ser. No. 809,673
Claims priority, application Japan, Jul. 8, 1974, 49/77374
Int. Cl.[2] B01J *1/00, 1/20*
U.S. Cl. 422—197 **2 Claims**

1. Reaction apparatus of the vertical type comprising: a vertically disposed heat exchanger having upper and lower ends; a header coupled to the upper end of said heat exchanger; a tube baffle having an upper surface disposed across the interior of said heat exchanger in a substantially horizontal plane to

define an inner space with said header; an inner member made of a corrosion-resistant material positioned in said inner space forming a chamber closely spaced from the inside surface of said header and conforming to the configuration of said inner space; a first inlet in said header for introducing corrosive fluid raw materials into said inner member; a second inlet for introducing a non-corrosive fluid, said second second inlet being connected to said header to supply the non-corrosive fluid between said header and said inner member; an outlet for reaction products; a plurality of openings formed through said tube baffle; a first plurality of vertical tubes attached to said tube baffle and extending through said openings, the upper end of said first plurality of tubes extending above the upper surface of said tube baffle whereby the upper end of said first plurality of tubes are well as the interior surface thereof are



protected from contact with the corrosive fluid that might accumulate on the upper surface of said tube baffle; and a second plurality of vertical tubes attached to and extending downwardly from said inner member and positioned coaxially with respect to said first plurality of vertical tubes, said second plurality of vertical tubes being spaced radially inwardly from said first plurality of vertical tubes and in fluid communication therewith for defining an annular space having a vertical plane located between the interior surface of said first plurality of vertical tubes and the exterior surface of said second plurality of vertical tubes, said annular space being located to receive the flow of non-corrosive fluid from said second inlet whereby the corrosive fluid from said first inlet and the non-corrosive fluid from said second inlet are combined within said first plurality of vertical tubes below the lower end of said second plurality of vertical tubes.

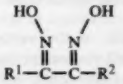
4,173,616

EXTRACTION OF COPPER VALUES FROM AQUEOUS SOLUTION

Peter Koenders; Abraham J. Van der Zeeuw, and Riekert Kok, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 7, 1978, Ser. No. 884,337
Int. Cl.[2] C01G *3/00;* C07C *131/14*
U.S. Cl. 423—24 **12 Claims**

1. A process for the separation, by liquid/liquid extraction, of copper values from an acidic aqueous solution containing copper values, which comprises contacting the acidic aqueous solution with an organic extractant comprising (a) a substantially water-immiscible organic solvent, (b) a hydroxy-oxime or a mixture of hydroxy-oximes capable of extracting copper values, and (c) between 0.1 and 10% by mole, calculated on hydroxy-oxime, of an alpha, beta-dioxime in the anti-stereoisomer configuration or a mixture of alpha, beta-dioximes each in the antistereoisomer configuration, said alpha, beta-dioxime or alpha, beta dioximes having the general formula



wherein R^1 represents an optionally substituted hydrocarbyl group and R^2 and optionally substituted hydrocarbyl group or a hydrogen atom and wherein R^1 and R^2 may be optionally joined to form an optionally substituted ring of carbon atoms.

4,173,617

PREPARATION OF MANGANOUS CHLORIDE SOLUTION

Jay Y. Welsh, Catonsville, and Irving Sochol, Baltimore, both of Md., assignors to Chemetals Corporation, Baltimore, Md.

Filed Feb. 23, 1978, Ser. No. 880,447
Int. Cl.[2] C01G *45/06*
U.S. Cl. 423—34 **15 Claims**

1. A method for the preparation of manganese chloride solution, which comprises:

(a) contacting a manganese-containing metal with an aqueous solution containing at least 10 grams of copper per liter, at a pH of less than about 2.5;

(b) introducing elemental chlorine into the solution;

(c) separating insolubles from the solution;

(d) introducing sufficient manganese-containing metal into the solution to provide a stoichiometric excess of manganese in relation to the copper content;

(e) separating insoluble copper and manganese from the solution; and

(f) recovering a manganous chloride solution.

4,173,618

PROCESS FOR REMOVAL OF ALUMINA FROM AQUEOUS ALKALI METAL CHROMATE SOLUTIONS

John W. Holtz, Solvay, N.Y., assignor to Allied Chemical Corporation, Morristown, N.J.

Filed Oct. 12, 1976, Ser. No. 731,187
Int. Cl.[2] C01G *37/14*
U.S. Cl. 423—58 **4 Claims**

1. A process for removing dissolved alumina from an aqueous alkali metal chromate solution containing dissolved alumina and at least 10 weight percent CTB alkali metal chromate which comprises contacting said solution, for 0.25 to 5 hours at a temperature between 70° C. and the boiling point, with a soluble-silica compound in an amount sufficient to provide an amount of dissolved silica substantially equivalent to that amount which is stoichiometrically required to react with the dissolved alumina in said solution to form crystalline alkali metal alumino silicate and removing said crystalline alkali metal alumino silicate from said solution.

4,173,619

COMBUSTION GAS DESULFURIZATION

Donald C. Erickson, 1704 S. Harbor La., Annapolis, Md. 21401

Filed Mar. 14, 1978, Ser. No. 886,596
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—210.5 **11 Claims**

1. In a regenerative process for removing H_2S, COS, and SO_2 from a sulfur-containing hot combustion gas which comprises:

a. scrubbing the combustion gas by contacting it with a molten alkali salt mixture;

b. regenerating the molten salt by contacting it with steam plus CO_2;

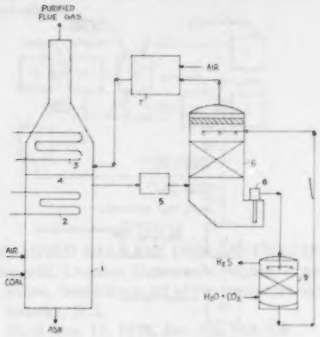
the improvement which comprises:

(i) establishing the quality of the combustion gas in the approximate range of 2% to 20% for the scrubbing contacting action;

(ii) maintaining the scrubbing salt temperature in the approximate range of 800 K to 950 K;

(iii) establishing the alkali cation composition of the salt such that is consists essentially of 40±20% potassium cations, 35±25% lithium cations, and balance sodium cations;

(iv) conducting the scrubbing contact within the approximate pressure range of 0.5 to 4 atmospheres;



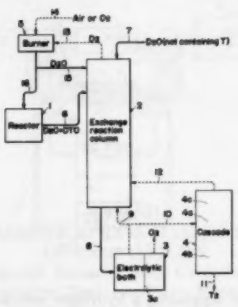
(v) increasing the salt pressure for regeneration to within the approximate range of 2 times scrub pressure to 60 times scrub pressure.

4,173,620

EXTRACTION METHOD OF TRITIUM

Masami Shimizu, Hayama, Japan, assignor to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Dec. 23, 1977, Ser. No. 863,614
Claims priority, application Japan, Dec. 27, 1976, 51-160202
Int. Cl.² C01B *4/00*
U.S. Cl. 423—249 **8 Claims**



1. A method of extracting tritium from tritium-containing heavy water which comprises:

leading a part of the tritium-containing heavy water from a heavy water source to an exchange reaction column wherein the heavy water is brought into countercurrent contact with a tritium-containing heavy hydrogen to thereby transfer tritium in the heavy hydrogen into the heavy water by way of the exchange reaction;

withdrawing the heavy water having an enriched tritium content from the bottom of said exchange reaction column and the heavy hydrogen having a reduced tritium content from the top of said exchange reaction column;

leading the tritium-enriched heavy water to a heavy hydrogen gas generator to generate a tritium-enriched heavy hydrogen;

recycling a part of the tritium-enriched heavy hydrogen to said exchange reaction column to carry out the countercurrent contact between the heavy water and the heavy hydrogen;

burning the tritium-depleted heavy hydrogen withdrawn from the top of the exchange reaction column to produce a tritium-depleted heavy water;

recycling the tritium-depleted heavy water to the heavy water source; p1 leading the remaining part of the tritium-enriched heavy hydrogen generated from the heavy hydrogen gas generator into a hot-wire type thermal diffusion colunm to enrich tritium; and

withdrawing the tritium gas from the thermal diffusion column.

4,173,621

PROCESS FOR IMPROVING THE REACTIVITY OF PHOSPHORUS PENTASULFIDE

Johannes Krause, Hürth; Günter Reichert, Merten; Franz Mainzer, Hürth, and Hermann Niermann, Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 22, 1977, Ser. No. 863,081
Claims priority, application Fed. Rep. of Germany, Dec. 29, 1976, 2659295
Int. Cl.² C01B *25/14*
U.S. Cl. 423—303 **2 Claims**

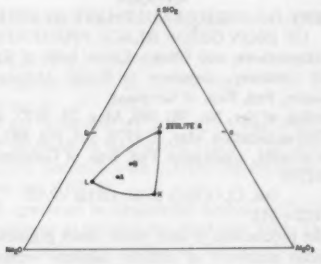
1. In a process for increasing the initial reactivity of phosphorus pentasulfide produced by reacting phosphorus and sulfur at a temperature higher than the melting point of phosphorus pentasulfide and allowing the resulting P_2S_5 melt to cool and solidify by means of a cooling device, the improvement which comprises: regulating the increase of the reactivity by placing the phosphorus pentasulfide melt on, or introducing it into, the cooling device; separating immediately an upper P_2S_5 layer of remaining liquid from a lower P_2S_5 layer being solidified by having direct contact with the cooling surface area of the cooling device; recycling the said upper P_2S_5 layer to the P_2S_5 melt; removing the said lower P_2S_5 layer from the cooling device and collecting it as final product; whereby the reactivity of the collected lower P_2S_5 layer is increased to the same extent as the quantitative ratio of the said upper P_2S_5 layer to the said lower P_2S_5 layer is increased, said ratio being 0.5/1.5 to 3/1 with the resultant increasing of the initial reactivity of the P_2S_5 by a minimum of about 150% to a maximum of about 400% respectively.

4,173,622

ZEOLITE A CRYSTALS OF UNIFORMLY SMALL PARTICLE SIZE AND THE MANUFACTURE THEREOF

James A. Robertson, Levittown, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jan. 3, 1978, Ser. No. 866,302
Int. Cl.² C01B *33/28*
U.S. Cl. 423—329 **4 Claims**



1. A process for the manufacture of zeolite A crystals that are uniform and less than ten microns in size which comprises the steps of:

(a) preparing zeolite A seed crystals by comminuting zeolite A crystals until seed crystals having a number average particle size of less than about 0.5 μm have been obtained and any cluster crystals that may be present are broken up;

(b) preparing a sodium aluminum silicate gel containing, on an anhydrous basis, from 26 to 62 mole percent sodium oxide, from 10 to 37 mole percent aluminum oxide, and from 24 to 50 mole percent silicone dioxide, said gel containing from about 88 to 98 mole percent water and being free of particles that would serve as nucleation sites for crystallization;

(c) uniformly distributing throughout said gel a predetermined quantity of the comminuted zeolite A seed crystals, the quantity being such that said gel is depleted and crystal growth is terminated when said seed crystals have grown to the desired size;

(d) maintaining said gel at a temperature above about 70° C. until crystallization of the gel is essentially complete; and

(e) separating the zeolite A crystals so formed from the reaction mixture, the number of zeolite A crystals present in the product separated being substantially the same as the number of seed crystals added.

4,173,623

HALOGENATION OF LEAD SULFIDE

J. Mark Richardson, Tucson, Ariz., and Norbert L. Novinski, II, Houston, Tex., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 811,931, Jun. 30, 1977, abandoned. This application Jun. 1, 1978, Ser. No. 911,613

Int. Cl.[2] C01G *21/16*

U.S. Cl. 423—494 **5 Claims**

1. In a process for the halogenation of a lead sulfide which comprises halogenating said lead sulfide at an elevated temperature with a halogen gas in a dry atmosphere, the improvement which comprises halogenating said lead sulfide in a fluidized bed with said halogen gas, said fluidized bed being effected by the introduction of a gas consisting essentially of a mixture of said halogen gas and air at a rate of from about 4 centimeters per second to about 12 centimeters per second to said lead sulfide within said fluidized bed, wherein the oxygen in said air is substantially inert to said halogenation within said fluidized bed, said halogen gas being present in said mixture in a ratio of from about 0.01:1 to about 0.2:1 parts by volume of halogen gas per part of said air.

4,173,624

RECOVERY OF SODIUM SULPHATE IN PRODUCTION OF IRON OXIDE BLACK PIGMENTS

Jakob Rademachers, and Günter Linde, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

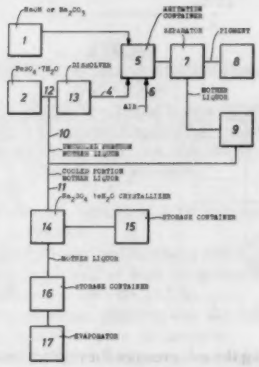
Continuation of Ser. No. 781,280, Mar. 25, 1977, abandoned. This application Mar. 2, 1978, Ser. No. 882,679

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1976, 2712798

Int. Cl.[2] C01D *5/00*; C01G *49/02*

U.S. Cl. 423—551 **1 Claim**

1. In the production of iron oxide black pigments with the simultaneous recovery of sodium sulphate wherein ferrous sulphate is reacted with an alkaline sodium compound at a pH from about 7 to 10 and a temperature above about 50° C., and the pigment formed is separated from the mother liquor containing sodium sulphate, the improvement which comprises conducting the reaction in sodium sulphate at a concentration of at least about 20% by weight, after separation of the pigment cooling at least part of the sodium sulphate-containing mother liquor to a temperature of at most about 30° C., thereby to crystallize sodium sulphate decahydrate, separating the crystals, and recirculating the mother liquor containing sodium



sulphate to dissolve additional ferrous sulphate for further reaction.

4,173,625

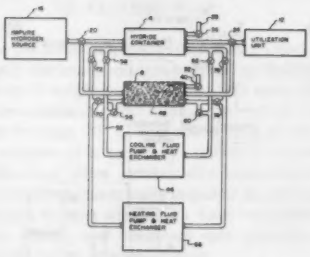
HYDROGEN PURIFICATION AND STORAGE SYSTEM

Roger E. Billings, Provo, Utah, assignor to Billings Energy Corporation, Provo, Utah

Division of Ser. No. 682,836, May 4, 1976, Pat. No. 4,108,605. This application Feb. 21, 1978, Ser. No. 879,044

Int. Cl.[2] C01B *1/32*

U.S. Cl. 423—648 R **2 Claims**



1. A method of separating a hydrogen enriched gas from a gas mixture containing hydrogen and other gaseous components, comprising

(a) supplying said gas mixture to a hydride container having a hydride forming material therein which is adapted to adsorb hydrogen gas from said gas mixture,

(b) venting unadsorbed gaseous components of said gas mixture from said hydride container,

(c) treating the hydrogen-loaded hydride material in said hydride container to desorb and release a hydrogen enriched gas therefrom, by controlling the temperature of said hydride forming material and the pressure in said hydride container so that hydrogen is released from said hydride forming material with substantially none of the other gaseous components which may have been adsorbed by said hydride forming material being released,

(d) delivering the hydrogen enriched gas from said hydride container to a hydrogen utilization unit,

(e) heating said hydride forming material to a second temperature greater than the controlled temperature of step (c) while maintaining the pressure in said hydride container at least no greater than the controlled pressure of step (c) to cause other gaseous components which may

have been adsorbed by said hydride forming material to be released therefrom, and

(f) releasing said other gaseous components from said hydride container.

4,173,626

SUSTAINED RELEASE INDOMETHACIN

Robert E. Dempski, Dresher; Gunvant N. Mehta, Lansdale, and Joseph C. Saboe, Norristown, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 11, 1978, Ser. No. 968,608
Int. Cl.[2] A61K *9/22, 9/48*
U.S. Cl. 424—19 3 Claims

1. A sustained release pharmaceutical formulation in capsule unit dosage form that provides prolonged plasma levels of indomethacin and is clinically effective, containing 25 to 150 mg of 500 to 1500 micron size pellets of indomethacin, in the form of:

(A) Uncoated pellets comprising pharmaceutical carriers and 5–50 mg of indomethacin for immediate release of about 35% of the total indomethacin, and rapid elevation of plasma levels; and

(B) Coated pellets comprising pharmaceutical carriers and 15–145 mg of indomethacin as a sustaining dose of about 65% of the total indomethacin wherein the coating consists of polyvinyl acetate as a slow dissolving material.

4,173,627

HAIR LACQUER SPRAYS HAVING REDUCED INFLAMMABILITY

Annie Madrange née Dermain, Saint Germain en Laye; Henri M. de Montalembert, Boulogne; Pierre Meurice, L'Isle Adam, and Jean-Louis Refregier, Boussy-Saint-Antoine, all of France, assignors to L'Oreal, Paris, France

Filed Apr. 17, 1978, Ser. No. 897,205
Claims priority, application France, Apr. 26, 1977, 77 12569
Int. Cl.[2] A61K *7/11*
U.S. Cl. 424—47 10 Claims

1. In the known type of pressurized container which contains a hair setting composition that is partially in the gaseous phase and partly in a single liquid phase, said composition containing:

(a) at least one resin suitable for use as a hair lacquer,

(b) an inflammable liquid phase for dissolving the resin,

(c) a propellant phase of which a part is in the form of a gas in the body of the pressurized container, said propellant phase providing the pressurization in the container,

the improvement comprising

(1) utilizing a propellant comprising bromotrifluoromethane,

(2) the bromotrifluoromethane being present in an amount ranging from about 5 to 30% by weight based on the total weight of the composition, and

(3) the valve of the pressurized container being a valve provided with an inlet for supplying additional gas.

4,173,628

METHOD OF TREATING BENIGN PROSTATIC HYPERTROPHY WITH CANDIMYCIN

Harry W. Gordon, c/o Schmid Labs., Inc. Rte. 46 West, Little Falls, N.J. 07424

Continuation of Ser. No. 628,790, Nov. 4, 1975, Pat. No. 4,039,661, which is a continuation-in-part of Ser. No. 584,607, Jun. 6, 1975, abandoned, which is a continuation of Ser. No. 414,968, Nov. 23, 1973, Pat. No. 3,920,813, which is a division of Ser. No. 313,568, Dec. 8, 1972, Pat. No. 3,843,785, which is a division of Ser. No. 194,052, Oct. 29, 1971, Pat. No. 3,721,734, which is a division of Ser. No. 70,509, Sep. 8, 1970, Pat. No. 3,714,347, which is a continuation-in-part of Ser. No. 544,712, Apr. 25, 1966, abandoned, and a continuation of Ser. No. 623,847, Mar. 17, 1967, Pat. No. 3,584,118. This application Mar. 9, 1977, Ser. No. 775,797
Int. Cl.[2] A61K *35/00*
U.S. Cl. 424—115 4 Claims

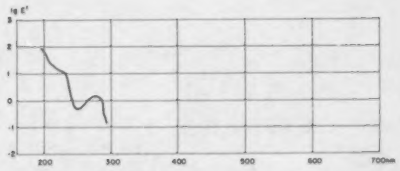
1. A process for treating prostatic hypertrophy in a mammal afflicted with benign prostatic hypertrophy which comprises orally administering to said mammal an effective amount for treating benign prostatic hypertrophy of candimycin.

4,173,629

ANTIBIOTIC S 31794/F-1

Michael M. Dreyfuss, Basel, and Hans Tscherter, Allschwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 702,210, Jul. 2, 1976, abandoned. This application Jun. 28, 1978, Ser. No. 919,760
Claims priority, application Switzerland, Jul. 8, 1975, 8894/75
Int. Cl.[2] A61K *35/00*
U.S. Cl. 424—118 6 Claims



1. A compound S 31794/F-1 having the following characteristics:

λ_{MAX} 194 nm $E_{1\ cm}^{1\%} = 807$,

λ_{MAX} 225 nm (shoulder) $E_{1\ cm}^{1\%} = 132$,

λ_{MAX} 276 nm $E_{1\ cm}^{1\%} = 12.8$,

λ_{MAX} 284 nm (shoulder) $E_{1\ cm}^{1\%} = 10.5$, (see FIG. 1);

^1H NMR spectrum in deuterated DMSO (100 megacycles per second second) with tetramethylsilane as internal standard (see FIG. 4);

^{13}C NMR spectrum in deuterated methanol (D_4) with tetramethylsilane as internal standard (see Table 1);

and having the following additional characteristics in amorphous form;

elementary analysis: C 53.9%, H 7.5%, N 10.1%, O 27.3%;

IR spectrum in kBr (see FIG. 2);

and having the following additional characteristics in crystalline form:

elementary analysis: C 55.5–56.5%, H 7.5–7.7%, N 10.5–10.8%, O 26.5–27.0%; IR spectrum in Nujol (see FIG. 3).

4,173,630

N^2ARYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, 15-18, Asahigaoka 3-chome, Tarumi-ku, Kobe-shi, Hyogo; Akiko Hijikata, Kobe; Ryoji Kikumoto, Machida; Yoshikuni Tamao, Yokohama; Kazuo Ohkubo, Machida; Tohru Tezuka, Yokohama, and Shinji Tonomura, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, Hyogo, both of, Japan

Continuation-in-part of Ser. No. 760,929, Jan. 19, 1977, Pat. No. 4,101,653, which is a continuation-in-part of Ser. No. 703,704, Jul. 8, 1976, Pat. No. 4,069,323, Ser. No. 671,568, Mar. 29, 1976, Pat. No. 4,049,645, and Ser. No. 671,436, Mar. 29, 1976, Pat. No. 4,062,963, said Ser. No. 671,568, and Ser. No. 671,436, each is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned.

This application May 4, 1978, Ser. No. 902,855

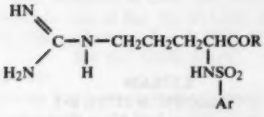
Claims priority, application Japan, Jun. 6, 1977, 52-66508

The portion of the term of this patent subsequent to Jul. 19, 1994, has been disclaimed.

Int. Cl.[2] A61K *37/00*; C07C *103/52*

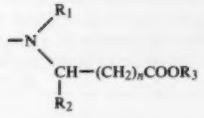
U.S. Cl. 424—177 15 Claims

1. An N^2-arylsulfonyl-L-argininamide of the formula (I):



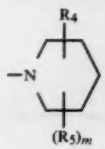
(I)

wherein R is selected from group consisting of



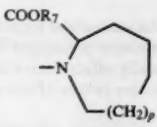
(1)

wherein R_1 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_3–C_{10} alkenyl, C_3–C_{10} alkynyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkylthioalkyl, C_2–C_{10} alkylsulfinylalkyl, C_1–C_{10} hydroxyalkyl, C_2–C_{10} carboxyalkyl, C_3–C_{10} alkoxycarbonylalkyl, C_3–C_{10} alkylcarbonylalkyl, C_1–C_{10} haloalkyl, C_7–C_{15} aralkyl, C_8–C_{15} α-carboxyaralkyl, C_3–C_{10} cycloalkyl, C_4–C_{10} cycloalkylalkyl, furfuryl, tetrahydrofurfuryl optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, 3-furylmethyl, tetrahydro-3-furylmethyl optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, tetrahydro-2-pyranylmethyl optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, 1,4-dioxa-2-cyclohexylmethyl optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, 2-thenyl, 3-thenyl, tetrahydro-2-thenyl optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, and tetrahydro-3-thenyl; R_2 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, carboxy, C_2–C_{10} alkoxycarbonyl, phenyl optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, C_7–C_{12} aralkyl and ring substituted benzyl wherein said substitutent is C_1–C_5 alkyl or C_1–C_5 alkoxy; R_3 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl and 5-indanyl; and n is an integer of 0, 1 or 2



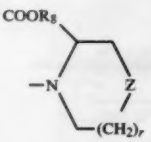
(2)

wherein R_4 is —$COOR_6$ wherein R_6 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl and 5-indanyl; each R_5 independently is hydrogen, C_1–C_{10} alkyl; phenyl, C_1–C_5 alkoxy or carboxy; m is an integer of 1 to 5; R_4 is substituted at the 2 or 3-position; and R_5 can be substituted at the 2, 3, 4, 5 or 6-position,



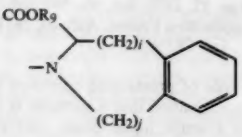
(3)

optionally substituted with at least one C_1–C_5 alkyl, C_1–C_5 alkoxy or mixtures thereof, wherein R_7 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl and 5-indanyl; and p is an integer of 1, 2, 3, or 4,



(4)

wherein R_8 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7—C_{12} aralkyl and 5-indanyl; Z is selected from the group consisting of oxy, thio and sulfinyl; and r is an integer of 0 or 1, and



(5)

wherein R_9 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl and 5-indanyl; i is an integer of 0, 1 or 2; j is an integer of 0, 1 or 2; and the sum of i + j is an integer of 1 or 2; and Ar is a phenyl group substituted with at least one substituent selected from the group consisting of alkyl, alkoxy and alkylcarbonyl, said substituent being optionally substituted with halo, alkoxy or alkoxycarbonyl, the number of the carbon atoms of each substituent which is attached to the phenyl group being 3 to 7 and the said phenyl group being optionally substituted further with at least one substituent selected from the group consisting of methyl, ethyl, methoxy, ethoxy, hydroxyl and halo.

4,173,631

7-METHYL-8-METHYLAMINO-10-(1'-D-RIBITYL)ISOALLOXAZINE

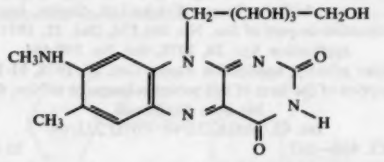
Donald W. Graham, Mountainside, and Edward F. Rogers, Middletown, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 716,498, Aug. 23, 1976, abandoned. This application Jun. 1, 1978, Ser. No. 911,619

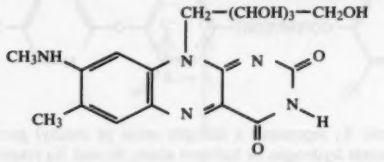
Int. Cl.[2] A61K *31/525;* **C07H** *19/04*

U.S. Cl. 424—180 **7 Claims**

1. The compound of the structural formula:



2. A pharmaceutically acceptable composition for the treatment of coccidiosis comprising an effective amount of the compound of the structural formula:



in poultry feed.

4,173,632

FASCIOLICIDAL COMPOSITIONS

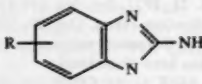
Larry R. Cruthers; Terrence M. James, both of Flemington, N.J.; Sidney Goff, New Hope, Pa., and Antoine R. Alouche, Sao Paulo, Brazil, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jul. 31, 1978, Ser. No. 929,876

Int. Cl.[2] A61K *31/62, 31/415*

U.S. Cl. 424—232 **8 Claims**

1. A fasciolicidal combination comprising a 5(6)-lower alkyl benzimidazol carbamate having the formula



wherein R is in the 5- or 6-position and is lower alkyl, and R^1 is lower alkyl or phenyl lower alkyl, in combination with a bromosalan component commprising 3,5-dibromo-N-(4-bromophenyl)-2-hydroxybenzamide alone or in admixture with 4',5-dibromosalicylanilide, and/or 3,5-dibromosalicylanilide, wherein the bromosalan component is present in a weight ratio to the 5(6)-lower alkyl benzimidazol carbamate of within the range of from about 2:1 to about 10:1.

4,173,633

INDENO AND NAPHTH[1,2-d]AZEPINES

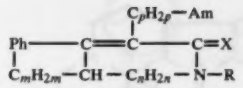
Norbert Gruenfeld, White Plains, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 2, 1977, Ser. No. 856,703

Int. Cl.[2] C07D *403/06;* **A61K** *31/55;* **C07D** *223/14*

U.S. Cl. 424—244 **9 Claims**

1. A compound of the formula



wherein pH is unsubstituted 1,2-phenylene, or 1,2-phenylene substituted by up to 3 members selected from lower alkyl, hydroxy, mercapto, lower alkoxy, lower alkylthio, lower alkenyloxy, halogeno and trifluoromethyl; C_mH_{2m} is lower alkylene separating the adjacent atoms by one or two carbon atoms; C_nH_{2n} is lower alkylene separating the adjacent atoms by two carbon atoms; p is an integer from 1 to 7; Am is amino, simple or mixed, mono- or di-lower (alkyl, alkenyl, alkynyl, hydroxyalkyl, 3 to 7 ring-membered cycloalkyl or H-Ph-alkyl-)amino; 5 to 7 ring-membered cycloalkyl or H-ph-alkyl)amino; 5 to 7 ring-membered lower alkyleneimino, morpholino, thiamorpholino, piperazino or N-(lower alkyl or hydroxyalkyl)-piperazino; X represents oxo and R is hydrogen, lower alkyl or hydroxyalkyl; a lower alkanoyl- or 1,11b-dihydro-derivative, or a therapeutically acceptable acid addition salt thereof.

8. A diuretic pharmaceutical composition comprising a diuretically effective amount of a compound as claimed in claim 1, together with a pharmaceutical excipient.

4,173,634

BASICALLY-SUBSTITUTED TRICYCLIC PYRAZOLES USEFUL AS ANTIINFLAMMATORY AGENTS

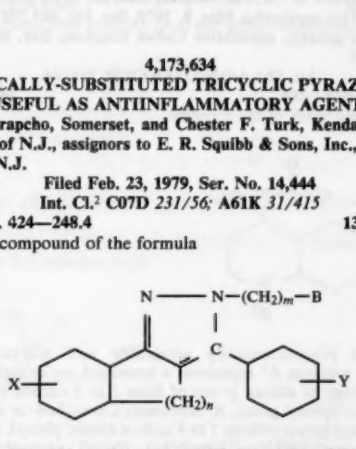
John Krapcho, Somerset, and Chester F. Turk, Kendall Park, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 23, 1979, Ser. No. 14,444

Int. Cl.[2] C07D *231/56;* **A61K** *31/415*

U.S. Cl. 424—248.4 **13 Claims**

1. A compound of the formula



wherein X and Y are the same or different and are H, halogen, lower alkyl, lower alkoxy, lower alkylthio, or trifluoromethyl, n is 1, 2 or 3, m is 2, 3 or 4, and B is dilower alkylamino, piperidino, pyrrolidino, morpholino, or N-lower alkyl-piperazino, and pharmaceutically acceptable acid-addition salts thereof.

13. A method for treating an inflammatory condition, which comprises administering to a mammalian host an antiinflammatory amount of a compound as defined in claim 1.

4,173,635

HYPOTENSIVE AJMALICINE DERIVATIVES

Jean A. A. J. Hannart, 98, Avenue De Fre, Brussels, Belgium

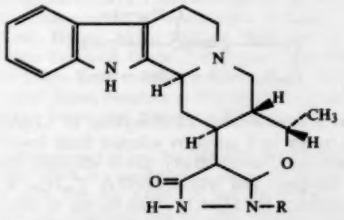
Filed Feb. 24, 1978, Ser. No. 880,731

Claims priority, application France, Feb. 28, 1977, 77 5826

Int. Cl.[2] A61K *31/445;* **C07D** *491/22*

U.S. Cl. 424—256 **6 Claims**

1. Derivative of ajmalicine of the formula:



(I)

wherein R represents either a hydrogen atom or a linear or branched alkyl radical having 1 to 6 carbon atoms and which may be substituted with one hydroxy group.

4. A hypotensive composition comprising as the active ingredient, a compound as defined in claim 1 or a pharmaceutically acceptable acid salt thereof or mixtures thereof in an effective hypotensive amount together with a pharmaceutically acceptable carrier or excipient.

4,173,636

DECAHYDROQUINOLINES, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE

Maurice Prost, Brussels, Belgium, assignor to Labaz, Paris, France

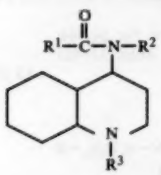
Continuation of Ser. No. 745,542, Nov. 29, 1976, abandoned. This application Mar. 8, 1978, Ser. No. 884,705

Claims priority, application United Kingdom, Dec. 16, 1975, 51507/75

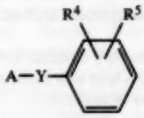
Int. Cl.[2] A61K *31/47*; C07D *215/44*

U.S. Cl. 424—258 **14 Claims**

1. Compounds of the formula:



and the pharmaceutically acceptable acid addition salts thereof, wherein R^1 represents a branched- or straight-chain alkyl group or alkoxy group of from 1 to 4 carbon atoms, a phenyl or pyridyl group; R^2 represents a branched- or straight-chain alkyl group of from 1 to 4 carbon atoms, phenyl, methylphenyl, methoxyphenyl, naphthyl, benzyl, phenethyl, cinnamyl, phenylpropyl or cyclohexyl; and R^3 represents a group of the formula:



wherein A represents a branched- or straight-chain alkylene group of one to four carbon atoms, inclusive; Y represents an oxygen atom, a carbonyl or carbonyl-hydroxyimino group; R^4 and R^5, which are identical or different, each represent hydrogen, fluorine, chlorine or bromine, or methyl, methoxy or acetyl.

8. A pharmaceutical analgesic or antihypertensive composition in dosage unit form containing as essential active principle 25 to 60 mg of a compound or a pharmaceutically acceptable acid addition salt thereof as claimed in claim 1 in association with a pharmaceutical carrier or excipient therefor.

13. A method of treating pain in a mammal in need of such treatment, said method consisting in systemically administering to the said mammal 25 to 60 mg of at least one compound as defind by claim 1 or a pharmaceutically acceptable acid addition salt thereof.

4,173,637

N-BENZOYL-N'-PYRIDYLOXY PHENYL UREA AND INSECTICIDAL COMPOSITIONS THEREOF

Ryuzo Nishiyama, Takatsuki; Kanichi Fujikawa, Kusatsu; Rikuo Nasu, Kusatsu; Tadaaki Toki, Kusatsu, all of Japan; Toshihiko Yamamoto, deceased, late of Kusatsu, Japan, and by Hikotaro Yamamoto, legal representative, Hyogo, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 844,174, Oct. 21, 1977. This application Apr. 24, 1978, Ser. No. 899,461

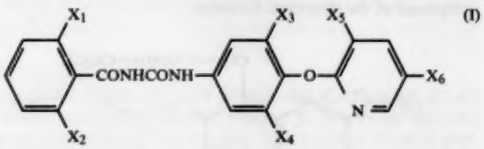
Claims priority, application Japan, Oct. 29, 1976, 51-130903

The portion of the term of this patent subsequent to Nov. 6, 1996, has been disclaimed.

Int. Cl.[2] A61K *31/44*; C07D *213/64*

U.S. Cl. 424—263 **32 Claims**

1. N-benzoyl N'-pyridyloxy phenyl urea having the formula



(I)

wherein X_1 represents a halogen atom or methyl group; X_2 represents hydrogen or halogen atom; X_3 and X_4 respectively represent hydrogen or halogen atom; X_5 represents hydrogen or halogen atom; X_6 represents a halogen atom or nitro or trifluoromethyl group.

21. An insecticidal composition which comprises an insecticidally effective amount of a N-benzoyl N'-pyridyloxy phenyl urea having the formula (I) according to claim 1 in admixture with a suitable carrier or adjuvant therefor.

4,173,638

N-BENZOYL-N'-PYRIDYLOXY PHENYL UREA AND INSECTICIDAL COMPOSITIONS THEREOF

Ryuzo Nishiyama, Takatsuki; Kanichi Fujikawa, Kyoto; Rikuo Nasu, Kusatsu; Tadaaki Toki, Kusatsu, and Toshihiko Yamamoto, Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

Filed Oct. 21, 1977, Ser. No. 844,174

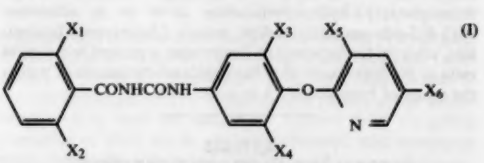
Claims priority, application Japan, Oct. 29, 1976, 51/130903

The portion of the term of this patent subsequent to Nov. 6, 1996, has been disclaimed.

Int. Cl.[2] A61K *31/44*; C07D *213/64*

U.S. Cl. 424—263 **17 Claims**

1. N-benzoyl N'-pyridyloxy phenyl urea having the formula



(I)

wherein X_1 represents a halogen atom; X_2 represents hydrogen or halogen atom; X_3 and X_4 respectively represent hydrogen or chlorine atom; X_5 represents hydrogen or halogen atom; X_6 represents a halogen atom or nitro or trifluoromethyl group.

10. An insecticidal composition which comprises insecticid-

ally effective amount N-benzoyl N'-pyridyloxy phenyl urea having the formula (I) according to claim 1 in admixture with a suitable carrier or adjuvant therefor.

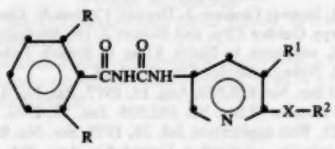
4,173,639

1-BENZOYL-3-(ALKOXY- OR ALKYLTHIOPYRIDINYL)UREAS

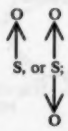
Robert G. Suhr, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Aug. 31, 1978, Ser. No. 938,722
Int. Cl.[2] C07D *213/76;* A01N *9/22*
U.S. Cl. 424—263 **21 Claims**

1. Compound of the formula



wherein each R is independently chloro, fluoro, methyl, or methoxy; R^1 is H, Cl, CH_3, or C_2H_5; X is O, S,



and R^2 is alkyl of C_1–C_5, alkenyl of C_3–C_5 containing no α,β-unsaturation, mono- or dibromo-C_1–C_5 alkyl, chloroalkyl of C_1–C_5, fluoroalkyl of C_1–C_5, cycloalkyl of C_4–C_6, or alkoxyalkyl of a total of C_2–C_5; and the acid addition salts thereof.

8. Method of suppressing insects of an order selected from the group consisting of Coleoptera, Diptera, Lepidoptera, and Orthoptera, which comprises applying to the locus of the insects an effective amount of an active agent which is a compound of claim 1.

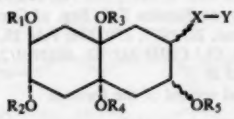
4,173,640

HYPOTENSIVE PERHYDRO NAPHTHALENE PENTOL DERIVATIVES

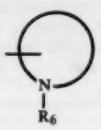
Frederic P. Hauck, Bridgewater; Michael E. Condon, Lawrenceville, and Joyce Reid, Dayton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 4, 1977, Ser. No. 821,891
Int. Cl.[2] A61K *31/445;* C07D *211/34*
U.S. Cl. 424—267 **13 Claims**

1. A compound of the structure



wherein R_1, R_2, R_3, R_4 and R_5 are the same or different and are selected from the group consisting of hydrogen or an acyl radical of a hydrocarbon carboxylic acid of less than 12 carbons, an acyl radical of trifluoroacetic acid, angeloyl, veratroyl, vanilloyl, erythro-2-hydroxy-2-methyl-3-acetoxybutyryl, (1)-2-methylbutyryl, (d)-2-hydroxy-2-methylbutyryl, (d)-threo-2,3-dihydroxy-2-methylbutyryl and (1)-erythro-2,3-dihydroxy-2-methylbutyryl, X is a single bond or CH_2 or CH_2CH_2, Y is



which represents a 5- or 6-membered saturated N-containing heterocyclic wherein R^6 is hydrogen or lower alkyl, or a stereoisomer thereof, or a physiologically acceptable acid salt thereof, or a physiologically acceptable quaternary salt thereof or an N-oxide thereof.

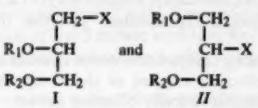
4,173,641

DI-O-N-ALKYL GLYCEROL DERIVATIVES AS IMMUNE STIMULANTS

Allen R. Kraska, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

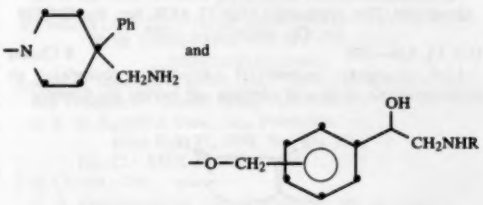
Filed May 15, 1978, Ser. No. 906,260
The portion of the term of this patent subsequent to Aug. 28, 1996, has been disclaimed.
Int. Cl.[2] A61K *31/445, 31/135;* C07D *211/26;* C07C *91/22*
U.S. Cl. 424—267 **18 Claims**

1. A compound selected from the group consisting of



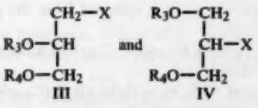
and the pharmaceutically acceptable acid addition salts thereof,

wherein R_1 and R_2 are each n-alkyl of 8 to 11 carbon atoms; and X is selected from



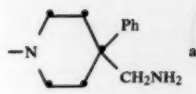
wherein R is hydrogen or alkyl of 1 to 6 carbon atoms and Ph is phenyl.

17. A method of stimulating non-specific cell-mediated immunity in a warm-blooded animal which comprises administering to said animal an immune-stimulant effective amount of a compound selected from the group consisting of

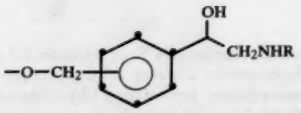


and the pharmaceutically acceptable acid addition salts thereof,

wherein R_3 and R_4 are each n-alkyl of 8 to 20 carbon atoms; and X is selected from



and



wherein R is hydrogen or alkyl of 1 to 6 carbon atoms and Ph is phenyl.

4,173,642

VASODILATING 1,1-DI-(2-METHOXYCARBONYL-ETHYL)-1,2,3,4,5,6,12,12B-OCTAHYDRO-INDOLO[2,3-a]QUINOLIZINE

Csaba Szantay; Lajos Szabo; György Kalaus; Egon Karpati, all of Budapest, and Laszlo Szporny, Szabolcska M u., all of Hungary, assignors to Richter Gedeon Vegyészeti Gyár Rt, Budapest, Hungary

Filed Dec. 29, 1977, Ser. No. 865,428

Claims priority, application Hungary, Dec. 30, 1976, RI 612

The portion of the term of this patent subsequent to Nov. 8, 1994, has been disclaimed.

Int. Cl.[2] C07D *471/04;* A61K *31/445*

U.S. Cl. 424—267 **2 Claims**

1. 1,1-Di-(2-methoxycarbonyl-ethyl)-1,2,3,4,6,7,12,12*b*-octahydro-indolo[2,3-a]quinolizine or the hydrochloride thereof.

2. A vasodilating composition which consists essentially of a vasodilatory effective amount of the compound defined in claim 1 in a pharmaceutically effective carrier.

4,173,643

SYNERGISTIC MICROBIOCIDAL COMPOSITIONS

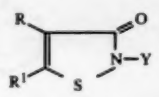
Andrew B. Law, Levittown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 426,881, Dec. 20, 1973, abandoned. This application May 17, 1978, Ser. No. 906,539

Int. Cl.[2] A01N *9/12, 9/20*

U.S. Cl. 424—270 **8 Claims**

1. A synergistic bactericidal composition comprising an isothiazolinone or its acid addition salt having the formula



wherein

Y is (C_1–C_8)alkyl, cyclohexyl, phenyl or benzyl or phenyl or benzyl substituted with up to two halogen atoms;

R is a methyl group, a hydrogen atom or a halogen atom; and

R′ is a hydrogen atom or a halogen atom;

and a bactericidal quaternary ammonium salt wherein the quaternary ammonium salt is selected from the group consisting of:

(a) n-alkyl (C_{14}:50%; C_{12}:40%; C_{16}:10%)dimethylbenzylammonium chloride;

(b) a mixture of 50% by weight alkyl (C_{14}:60%; C_{16}:30%; C_{12}:5%; C_{18}:5%)dimethylbenzylammonium chloride; and 50% alkyl (C_{12}:50%; C_{14}:30%; C_{16}:17%; C_{18}:3%)dimethylethylbenzylammonium chloride;

(c) a mixture of (n-C_8 to n-C_{18})alkyldimethylbenzylammonium chlorides containing not less than 40% by weight n-C_{12} alkyl, not less than 20% n-C_{14} alkyl and not less than 70% by weight total of n-C_{12} and n-C_{14} alkyl;

(d) p-diisobutylphenoxyethoxyethyldimethylbenzylammonium chloride;

(e) a mixture of 80% by weight of methyldodecylbenzyltrimethylammonium chloride and 20% of methyldodecylxylylenebis(trimethyl)ammonium chloride;

(f) di-n-alkyl (C_8–C_{11} n-alkyl, average C_{10}) dimethylammonium chloride; and

the weight ratio of the 4-isothiazolin-3-one to the quaternary ammonium salt is from 5:1 to 1:50.

4,173,644

THIOUREA COMPOUNDS, COMPOSITIONS AND METHODS AND USE

Thomas H. Brown; Graham J. Durant; Charon R. Ganellin, all of Welwyn Garden City, and Robert J. Ife, Stevenage, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

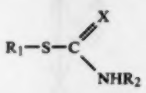
Division of Ser. No. 823,559, Aug. 11, 1977, Pat. No. 4,120,966, which is a division of Ser. No. 652,925, Jan. 27, 1976, Pat. No. 4,056,621. This application Jul. 28, 1978, Ser. No. 928,924

Claims priority, application United Kingdom, Feb. 3, 1975, 4538

Int. Cl.[2] C07D *277/30;* A61K *31/425*

U.S. Cl. 424—270 **4 Claims**

1. A compound of the formula:



wherein R_1 represents a grouping of the structure

$$Het—CH_2S(CH_2)_2—$$

wherein Het is a thiazole, isothiazole, or thiadiazole ring, which ring is optionally monosubstituted or disubstituted by lower alkyl, lower alkoxy or halogen R_2 is hydrogen, lower alkyl or the same as R_1; X is sulphur, =NH or =NCN; or a hydrate or pharmaceutically acceptable acid addition salt or hydrated salt thereof.

4. A method of blocking histamine H_2-receptors which comprises administering to an animal in an effective amount to block said receptors a compound of claim 1.

4,173,645

SUBSTITUTED 4,5-DIHYDROXY-IMIDAZOLIDINE-2-THIONES AND THEIR USE AS ECTOPARASITICIDES

Edgar Enders, Cologne; Volker Ebbighausen, Leverkusen; Wolfgang Gau, Wuppertal; Christian Wünsche, Schwelm, and Wilhelm Stendel, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

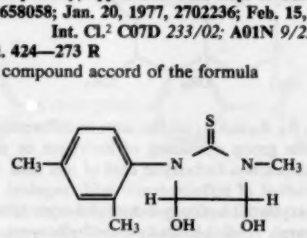
Filed Dec. 8, 1977, Ser. No. 858,917

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1976, 2658058; Jan. 20, 1977, 2702236; Feb. 15, 1977, 2706265

Int. Cl.[2] C07D *233/02;* A01N *9/22*

U.S. Cl. 424—273 R **6 Claims**

1. A compound accord of the formula



(A)

2. An ectoparasiticidal composition containing as active ingredient an effective amount of a compound according to

claim 1 in admixture with a solid or liquefied gaseous diluent or carrier or in admixture with a liquid diluent or carrier containing a surface-active agent.

4,173,646

TRICYCLICDICARBOXIMIDES

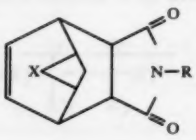
Kenneth L. Shepard, Ambler, and William J. Paleveda, Jr., Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 831,463, Sep. 8, 1977, Pat. No. 4,132,799, which is a division of Ser. No. 713,765, Aug. 12, 1976, Pat. No. 4,061,763, which is a division of Ser. No. 575,918, May 9, 1975, Pat. No. 4,006,233, which is a continuation-in-part of Ser. No. 511,961, Oct. 4, 1974, abandoned. This application Sep. 28, 1978, Ser. No. 946,926

Int. Cl.[2] A61K *31/40;* **C07D** *403/04, 417/04*

U.S. Cl. 424—270 **5 Claims**

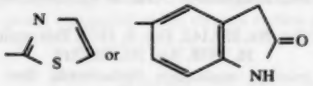
3. A pharmaceutical composition comprising a therapeutically effective amount in unitary dosage form of a compound having the formula:



wherein:

X is $-CH_2-$ or $-CH=CH-$;

R is



or a non-toxic pharmaceutically acceptable salt thereof and a pharmaceutical carrier therefor.

4,173,647

4-SPECTINOMYCYLAMINE AND SALTS THEREOF

Roland Maier; Eberhard Woitun, both of Biberach, an der Riss; Wolfgang Reuter, Laupertshausen; Bernd Wetzel; Hanns Goeth, both of Biberach, an der Riss, and Uwe Lechner, Ummendorf, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany

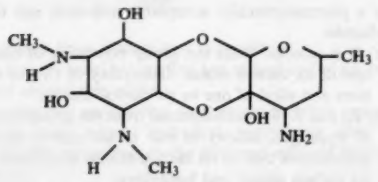
Filed Dec. 4, 1978, Ser. No. 965,869

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1977, 2756914

Int. Cl.[2] A61K *31/35;* **C07D** *311/02, 319/08*

U.S. Cl. 424—283 **4 Claims**

1. The compound of the formula



the R- or S- isomer thereof, or a non-toxic, pharmacologically acceptable acid addition salt of said compound or said isomer.

3. An antibiotic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective antimicrobial amount of a compound of claim 1.

4. The method of destroying harmful microorganisms or suppressing their multiplication or growth in a warm-blooded animal, which comprises perorally, parenterally or rectally administering to said animal an effective antimicrobial amount of a compound of claim 1.

4,173,648

3β-HYDROXY-18β-OLEAN-9-EN-30-OIC ACIDS

Giorgio Pifferi, Milan; Achille Umani-Ronchi, Ancona; Carlo Farina, Valsolda, and Afro Gamba, Milan, all of Italy, assignors to I.S.F. SpA, Milan, Italy

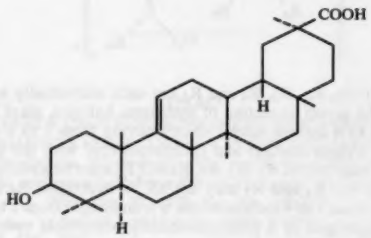
Filed Mar. 13, 1978, Ser. No. 886,145

Claims priority, application Italy, Mar. 16, 1977, 21296 A/77

Int. Cl.[2] C07C *65/14, 69/02, 69/34*

U.S. Cl. 424—294 **11 Claims**

1. The compound of the formula:



and the corresponding esters in the 3-position with mono- and di-alkanoic acids of 2 to 5 carbon atoms, as well as the pharmaceutically acceptable salts thereof with alkali metals, amino acids and copper.

11. Pharmaceutical compositions, containing an ulcer inhibiting effective amount of at least one compound according to claim 1, in admixture with a solid or liquid pharmaceutical diluent or carrier.

4,173,649

5-PHENYL-2,4-PENTADIEN-1-AMINES AND METHOD FOR INHIBITING PROSTAGLANDIN DEHYDROGENASE

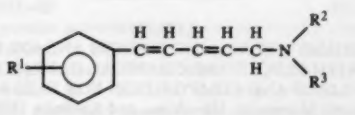
Joseph E. Sundeen, Yardley, Pa.; Tamara Dejneka, Skillman, and Frederic P. Hauck, Bridgewater, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 27, 1978, Ser. No. 881,271

Int. Cl.[2] A61K *31/275, 31/24, 31/195, 31/135*

U.S. Cl. 424—304 **3 Claims**

1. A pharmaceutical composition for use in treatment of gastric ulcers comprising a therapeutically effective amount of a compound of the structure



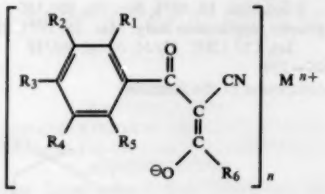
wherein R^1 is hydrogen, lower alkyl, lower alkoxy, halogen, hydroxy, lower alkanoyloxy, nitro, cyano, amino, carboxy or lower alkoxycarbonyl, and R^2 and R^3 may be the same or different and are hydrogen, lower alkyl, alkenyl-lower alkyl, phenyl-lower alkyl, lower alkylphenyl-lower alkyl, halophenyl-lower alkyl, halo-lower alkyl, hydroxy-lower alkyl, lower alkoxy carbonyl-lower alkyl and cyano-lower alkyl, and physiologically acceptable salts thereof and a pharmaceutically acceptable carrier therefor.

4,173,650
CIS-2-BENZOYL-3-HYDROXY-2-ALKENONITRILES AS ANTI-INFLAMMATORY AGENTS

John W. Hanifin, Jr., Suffern, and David N. Ridge, Grandview, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

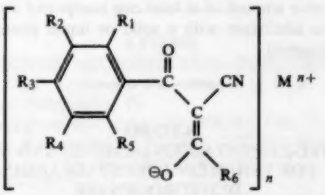
Filed Nov. 3, 1978, Ser. No. 957,595
Int. Cl.[2] A61K *31/275;* C07C *121/76*
U.S. Cl. 424—304 19 Claims

1. A compound selected from the group consisting of those of the formula:



wherein R_1, R_2, R_3, R_4 and R_5 are each individually selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, trifluoromethyl and trichloromethyl with the proviso that at least two of R_1, R_2, R_3, R_4 and R_5 must be hydrogen but R_1, R_2, R_3, R_4 and R_5 may not all be hydrogen; R_6 is alkyl having from 1 to 4 carbon atoms; n is an integer from 1 to 3 and M is hydrogen or a pharmaceutically acceptable cation; and the tautomers thereof.

16. The method of inhibiting the progression of arthritis in a mammal which comprises administering to said mammal an effective amount of a compound selected from the group consisting of those of the formula:



wherein R_1, R_2, R_3, R_4 and R_5 are each individually selected from the group consisting of hydrogen, halogen, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, trifluoromethyl and trichloromethyl with the proviso that at least two of R_1, R_2, R_3, R_4 and R_5 must be hydrogen but R_1, R_2, R_3, R_4 and R_5 may not all be hydrogen; R_6 is alkyl having from 1 to 4 carbon atoms; n is an integer from 1 to 3 and M is hydrogen or a pharmaceutically acceptable cation; and the tautomers thereof.

4,173,651
METHOD FOR KILLING INSECTS AND/OR FUNGI WITH ELECTRO-MECHANICAL ULTRASONIC NEBULIZER AND COMPOSITION FOR SAID METHOD

Takayoshi Muramoto, Hiroshima, and Kunitaka Orita, Yanai, both of Japan, assignors to Fumakilla Limited, Tokyo, Japan

Filed Jun. 16, 1976, Ser. No. 696,825
Claims priority, application Japan, Jun. 23, 1975, 50-75706; Jan. 27, 1976, 51-7095
Int. Cl.[2] A01N *9/24, 9/36, 9/12, 9/20*
U.S. Cl. 424—306 14 Claims

1. A method for killing insects and fungi on plants or in nearby air comprising the steps of:

applying thereto an insecticidal or fungicidal effective amount of a composition selected from the group consisting of the following solutions, and wherein each solution contains an agent and a solvent, said agent being about 2 to 20% by weight of said composition:

a solution of allethrin in n-pentadecane;
a solution of d-cis, trans-allethrin in n-hexadecane;
a solution of resmethrin in n-hexadecane;
a solution of DDVP in n-tetradecane and isopropyl alcohol;
a solution of d-cis, trans-resmethrin in n-hexadecane;
a solution of d-cis, trans-allethrin and d-cis, trans-resmethrin in n-dodecane;
a solution of 0.3% oil suspension of DDVP in kerosene;
and a solution of 0.5% oil suspension of diazinon in kerosene;

wherein said composition is applied by nebulization in an electromechanical ultrasonic transducer operating in a frequency range of between 800,000 and 1,700,000 Hz to effect atomization and vaporization in air of a concentration of said composition, the atomized and vaporized particles of said composition having a particle size in the range of 0.5 to 5 microns.

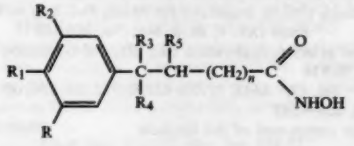
4,173,652
PHARMACEUTICAL HYDROXAMIC ACID COMPOSITIONS AND USES THEREOF

Antonius H. N. M. Bruins, and Gerlof Vollema, both of Ossk, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 859,142, Dec. 9, 1977. This application Oct. 31, 1978, Ser. No. 956,513
Claims priority, application Netherlands, Dec. 18, 1976, 7614113
Int. Cl.[2] A61K *31/165*
U.S. Cl. 424—324 3 Claims

1. A pharmaceutical composition having inhibitive and disaggregative properties towards blood platelet aggregation, comprising:

(A) a therapeutically effective amount to inhibit and disaggregate blood platelet aggregation of a compound of the formula:



or a pharmaceutically acceptable non-toxic salt thereof, wherein:

(a) R is selected from the group consisting of alkoxy of one to six carbon atoms, alkenyloxy of two to six carbons and alkyl of one to six carbon atoms;
(b) R_1 and R_2 are each selected from the group consisting of hydrogen, alkoxy of one to six carbon atoms, alkenyloxy of two to six carbon atoms, alkyl from one to six carbon atoms, and benzyloxy;
(c) R_3 and R_4 are selected from the group consisting of hydrogen and alkyl of one to six carbon atoms;
(d) R_5 is hydrogen or together with R_3 and R_4 methylene, and
(e) n signifies the number 0 or 1; and

(B) a pharmaceutically acceptable carrier.

4,173,653

OXYDIACETALDEHYDE COMPOSITIONS USED AS DISINFECTANTS

David C. F. Law, Arlington, Tex., assignor to Arbrook, Inc., Arlington, Tex.

Filed Dec. 11, 1974, Ser. No. 531,842
Int. Cl.[2] A01N *9/24*
U.S. Cl. 424—333 9 Claims

1. A sporicidal composition containing an aqueous solution of 3% oxydiacetaldehyde, 1.4% sodium acetate and 1% phosphate buffer at pH 8.

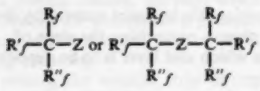
4,173,654

NOVEL FLUOROHYDROCARBONS

Kirby V. Scherer, Santa Monica, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Jan. 3, 1977, Ser. No. 756,011
Int. Cl.[2] A61K *31/02, 31/035;* C07C *19/08*
U.S. Cl. 424—350 11 Claims

1. A fluorochemical compound containing 9 to 15 carbon atoms selected from compounds of the formulae:



where

$R_f = C_nF_{2n}+1$

$R_f' = C_{n'}F_{2n'}+1$

$R_f'' = C_{n''}F_{2n''}+1$

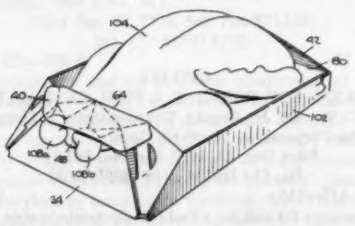
and n, n′ and n″ are integers from 1 to 11 and Z is a hydrocarbon moiety containing at least 2 hydrogen atoms and has a methylene group connected to the tertiary carbon atom.

4,173,655

POULTRY TRAY

James L. Capo, Franklin, Ohio, assignor to International Paper Company, New York, N.Y.

Filed Jun. 8, 1978, Ser. No. 913,802
Int. Cl.[2] B65D *85/54*
U.S. Cl. 426—129 24 Claims



1. A blank for a poultry tray comprising:

(a) a bottom panel having first and second end edges and first and second side edges;

(b) a rear end wall having an aperture and first and second connecting edges, said first connecting edge being hingedly connected to the first end edge of the bottom panel;

(c) a tail shield hingedly conneted to the second connecting edge of the rear end wall;

(d) a side wall hingedly connected to one of the side edges of the bottom panel; and

(e) means for locking the rear end wall to the side wall at an acute angle to the bottom panel.

4,173,656

MEANS AND METHOD FOR AGING LIQUOR

Richard S. Duggins, 41 Mountainside Dr., Wayne, N.J. 07470

Filed Feb. 23, 1976, Ser. No. 660,720
Int. Cl.[2] C12H *1/12, 1/22*
U.S. Cl. 426—422 11 Claims

1. A composition for use in aging liquors, comprising:

particles of charred wood; and

particles of "red layer" wood which may be placed in the liquor to be aged.

4. A device for treating beverges, comprising:

a liquid permeable container;

particles of treating material including particles of red layer wood and charred wood retained in said container; and

means associated with the container facilitating relative movement between a beverage and the container, so that the beverage will flow through the particles for treatment when the device is placed in the beverage.

4,173,657

VEGETABLE PROTEIN INGREDIENT FOR KAMABOKO PRODUCTS CONTAINING A POLYSACCHARIDE

E. Lorna Gaudio, Edwardsville, Ill., and S. Kent Holt, Tokyo, Japan, assignors to Ralston Purina Company, St. Louis, Mo.

Filed Feb. 21, 1978, Ser. No. 879,190
Int. Cl.[2] A23J *3/00;* A23L *1/325*
U.S. Cl. 426—574 5 Claims

1. A gelled fish product comprising fish and a composition consisting essentially of a soy protein isolate and a polysaccharide in an added amount by weight of the fish product, selected from the group consisting of 0.1 to 0.5% alginates and salts thereof, 0.2 to 0.8% locust bean gum, 0.0125 to 0.5% xanthan gum, 0.125 to 0.5% carrageenans and salts thereof, 0.075 to 0.5% guar gum, 0.0225 to 0.5% methyl cellulose, 0.3 to 6.5% pectin, and 0.1 to 0.5% carboxymethyl cellulose, wherein the level of said composition does not exceed about 90% by weight of the fish flesh.

4,173,658

POWDER COATING COMPOSITIONS

Hanns-Jörg Bax; Jörn Rüter, and Roland Feinauer, all of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Continuation of Ser. No. 776,817, Mar. 11, 1977, abandoned. This application Jun. 28, 1978, Ser. No. 920,085
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1976, 2611691
Int. Cl.[2] B05D *3/02, 1/24*
U.S. Cl. 427—27 10 Claims

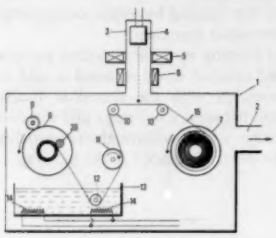
1. In a powder polyester coating composition for coating of metallic surfaces at high temperatures whose polyester is a saturated, high-molecular thermoplastic co-polyester obtained by condensation of a functional derivative of a mixture of dicarboxylic acids with one or more diols at least 60 molar percent of which is 1,4-butanediol, the improvement wherein the acid portion of the polyester polymer units consists essentially of a mixture of three acids which are (a) terephthalic acid, (b) 10–60 molar percent of one or more cycloaliphatic dicarboxylic acids of up to 12 carbon atoms and (c) up to 20 molar percent of one or more aliphatic dicarboxylic acids of 2–12 carbon atoms, whereby high values of both Erichsen depression and impact depression are achieved in the finally applied coating.

4,173,659

METHOD FOR MANUFACTURING SENSITIVE ELEMENTS HAVING A PERMANENT ELECTRIC POLARIZATION

Jean-Claude Dubois, Royan, and Alain Delaunay, Lugon, both of France, assignors to Institut Francais du Petrole, France

Filed Jul. 5, 1977, Ser. No. 821,860
Claims priority, application France, Jul. 5, 1976, 76 20698
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—35 5 Claims



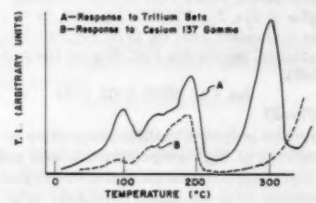
1. A method for manufacturing an electret consisting of placing a substrate of plastic material in an air evacuated enclosure under a high vacuum; subjecting said substrate to electron bombardment to impart thereto a permanent electric polarization; and contacting said substrate in said air-evacuated enclosure after said electron bombardment while maintaining said high vacuum with a liquid of very low saturated vapor pressure whose dielectric strength is higher than that of rarified air.

4,173,660

METHOD OF PREPARING A THERMOLUMINESCENT PHOSPHOR

Jerome B. Lasky, and Paul R. Moran, both of Madison, Wis., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 819,429, Jul. 27, 1977, Pat. No. 4,121,010. This application Jul. 13, 1978, Ser. No. 924,338
Int. Cl.[2] B05D *5/12, 3/06*
U.S. Cl. 427—38 8 Claims



1. A method of preparing a thermoluminescent phosphor for use as a dosimeter comprising:

providing a thermoluminescent phosphor of LiF doped with magnesium;

heating said phosphor to a temperature in excess of 400° C.; and

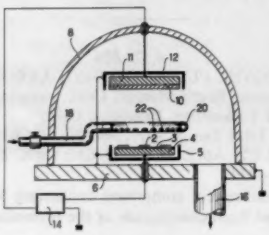
contacting said phosphor with a boron-containing vapor whereby boron is diffused into the surface portion of said phosphor.

4,173,661

METHOD FOR DEPOSITING THIN LAYERS OF MATERIALS BY DECOMPOSING A GAS TO YIELD A PLASMA

Bernard Bourdon, Orsay, France, assignor to Alsthom-Atlantique, Paris, France

Filed Oct. 27, 1977, Ser. No. 846,073
Claims priority, application France, Nov. 18, 1976, 76 34688
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—39 10 Claims



1. A method for depositing thin layers of material by decomposing a gas to yield a plasma, comprising the steps of:

placing a substrate on which said layer is to be deposited in a chamber;

circulating in said chamber a gaseous medium from which said material can be formed by decomposition, and maintaining the gaseous medium at a pressure between 10^{-2} and 10^{-4} torr in the vicinity of the substrate;

applying a high-frequency alternating voltage between a conductive earth surface and a conductive target surface located on opposite sides of the substrate so as to form a plasma in said chamber in the vicinity of the substrate; and

connecting said substrate to the target surface through a biasing impedance, the improvement and wherein said step of circulating said gaseous medium in said chamber comprises jelling into the chamber from a tube in which the pressure is maintained between 0.2 and 4 torr, said gaseous medium through injection ports which face the substrate.

4,173,662

PROCESS FOR FORMING A FUEL CELL MATRIX

Robert C. Stewart, Jr., Granby, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 23, 1977, Ser. No. 863,815
Int. Cl.[2] H01M *2/14;* B05D *1/30*
U.S. Cl. 427—115 9 Claims

1. A process for making a fuel cell electrode/matrix element comprising the steps of:

creating a continuous falling curtain of material having a viscosity of between 50 and 1000 centipoise and comprising between 15% and 60%, by weight, fuel cell electrolyte matrix material carried in a balance of liquid vehicle by flowing said curtain material through a slot of constant width between 25 and 80 mils, the rate of mass flow of the curtain being maintained substantially constant;

passing a fuel cell electrode through said curtain at a constant speed to coat a surface of said electrode with said curtain material; and

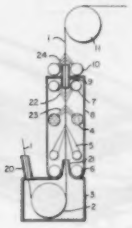
heat treating the coated electrode to remove the liquid vehicle leaving a layer of matrix material on the electrode surface.

4,173,663

DIPLESS METALLIZING PROCESS AND APPARATUS

Theodore Bostroem, Park Rd. Ext., Middlebury, Conn. 06762

Continuation of Ser. No. 482,886, Jun. 25, 1975, abandoned.
This application Jul. 14, 1976, Ser. No. 705,351
Int. Cl.[2] B05D *1/02, 1/28, 1/40*
U.S. Cl. 427—211 11 Claims



1. In a process of providing a metallic article in strip form with a metallic coating, the steps which comprise

(a) passing the metallic strip preheated to coating temperature in a substantially vertical direction through a processing chamber;

(b) passing the metallic strip through a coating zone and applying by distributing means a continuous stream of the molten coating metal uniformly to both sides of the metallic strip for a short period of time so as to minimize the formation of an intermediate alloy layer between the coating metal layer and the surface of the metallic article;

(c) conducting excess molten coating away from the metallic strip by deflecting any excess coating running downwardly from the article strip, whereby the coating can be recovered and does not interfere with the conveying of successive portions of the strip to the coating zone, and

(d) subjecting the coated metallic strip to the action of a hot, non-oxidizing gas blast subsequent to said coating application so as to remove any remaining excess coating metal from the coated metallic article.

4,173,664

PARYLENE STABILIZATION

Gary S. Cieloszyk, Somerville, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jan. 20, 1978, Ser. No. 871,146
Int. Cl.[2] B05D *3/02*
U.S. Cl. 427—385 R 17 Claims

1. A process for making an article comprising (a) a solid substrate and (b) a coating on said substrate, said coating comprising parylene admixed with a sterically hindered phenol wherein the amount of hindered phenol is about 0.1 to about 15 percent by weight based on the weight of the parylene,

said process comprising diffusing the hindered phenol into the parylene by bringing the hindered phenol into contact with the parylene and providing sufficient heat to cause the diffusion.

4,173,665

METHOD OF RUSTPROOFING MOTOR VEHICLES

Roy J. Nida, 22W054 Stratford Pl., Glen Ellyn, Ill. 60137

Filed Apr. 13, 1978, Ser. No. 895,917
Int. Cl.[2] C09I *11/02;* B32B *25/16, 25/00, 27/04*
U.S. Cl. 427—421 10 Claims

1. An improved method of rustproofing a motor vehicle comprising:

applying a rustproofing composition to the metal panels of the motor vehicle bodies for preventing corrosion of same,

said improved rustproofing composition comprising a substantially uniform dispersion of:

at least approximately twenty (20) percent polychloroprene polymer latex solids dispersed in an aqueous medium;

at least approximately one (1) percent of at least one surface active agent selected from the group of antifoam and wetting agents; and

at least approximately twenty (20) percent of pigment solids.

4,173,666

FLAME RESISTANT CELLULOSE FIBER INSULATION AND PROCESS OF PREPARING IT

Mario J. Quinto, The Seaco Corp., 581 Hope St., Stamford, Conn. 06907

Filed Sep. 11, 1978, Ser. No. 941,652
Int. Cl.[2] D04H *1/58*
U.S. Cl. 427—427 3 Claims

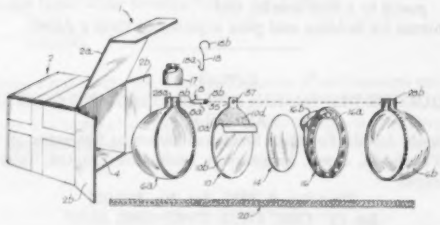
1. A process of producing flame resistant cellulose fiber insulation which comprises producing an aqueous solution of the reaction product of borax and at least one mineral acid and spraying cellulose fiber insulation with said solution without separation of the reaction products to produce a sprayed product, whereby the solution penetrates the cellulose fibers and coats them uniformly, and product which on drying has about 7% to about 20% of solids of the reaction products.

4,173,667

CHRISTMAS ORNAMENT AND KIT FOR MAKING THE SAME

William C. Rusch, Bow Lane R.R. 2, Barrington Hills, Ill. 60010

Filed Apr. 28, 1977, Ser. No. 791,924
Int. Cl.[2] A47G *33/08*
U.S. Cl. 428—11 12 Claims



1. A kit for making an ornament comprising in combination: a pair of housing-forming members each open along a side thereof and interlockable into confronting relation along their open sides to form a housing enclosure therebetween, said housing-forming members having complementary confrontable narrow neck-forming portions which extend upwardly from the respective housing-forming members, at least one of said members having a transparent portion enabling the interior of the resulting housing to be viewed, hang rod-forming means extending or extendable between said confronting narrow neck-forming portions, and an ornamental article mountable in a given predetermined position in said housing so as to be visible through said transparent portion of at least said one housing-forming member, said ornamental article having means adapted to receive and make hanging engagement with said rod-forming means.

5. The kit of claim 1 wherein both of said housing-forming members are transparent, enabling the interior thereof to be viewed from opposite sides thereof, and said ornamental article is a greeting card blank where both sides thereof are visible clearly from said opposite sides of said housing, said greeting card blank having greeting card indicia visible on one side thereof, the opposite side of said greeting card blank having a pressure sensitive adhesive thereon for holding a photograph thereon, and a peelable backing sheet covering said adhesive layer.

4,173,668
FIRE-SCREENING PANEL

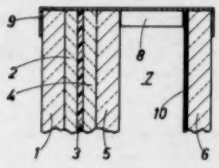
Walther E. Hentzelt, Witten-Annen; Hans-Henning Nolte, and Wolf von Reis, both of Gelsenkirchen, all of Fed. Rep. of Germany, assignors to BFG Glassgroup, Paris, France

Filed Dec. 1, 1975, Ser. No. 636,745

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1974, 2457037

Int. Cl.[2] B32B *17/06, 15/04*

U.S. Cl. 428—34 **23 Claims**



1. A fire-screening glazing panel comprising

a first structural ply formed by a vitreous sheet,

a second structural ply formed by a vitreous or plastic sheet,

a layer of intumescent material between said first and second structural plies, said material being convertible to form a thermally insulating barrier of porous or cellular structure when said panel is subjected to sufficient heat, such as when said panel is subjected to a fire,

an infra-red reflecting coating disposed on a ply of said panel, said coating being isolated from said intumescent material between said first and second plies and said coating reducing the effects of aging upon said panel if exposed to a heat source, and

means for holding said plies together to form a panel.

4,173,669
AQUEOUS DISPERSION FOR COATING AND COATED ARTICLES

Takeshi Ashida; Fumitaka Saito, and Masateru Akamatsu, all of Yokohama, Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Filed Sep. 9, 1977, Ser. No. 832,021

Int. Cl.[2] C03C *17/32, 25/02;* **C08L** *33/02*

U.S. Cl. 428—35 **19 Claims**

1. An aqueous dispersion for coating comprising a partially neutralized copolymer comprising from 99 to 75 mol % of ethylene and from 1 to 25 mol % of α,β-ethylenically unsaturated carboxylic acid of which at least 10% is neutralized with metallic and/or ammonium ions, wherein the improvement comprises using the partially neutralized copolymer of ethylene and α,β-ethylenically unsaturated carboxylic acid having a composition distribution of the acidic units within the range from 0.50 to 0.95 in terms of the ratio of the reciprocal of the minus first-order moment of the distribution of the acidic units to the plus first-order moment of the distribution of the acidic units.

4,173,670
COMPOSITE TUBULAR ELEMENTS

Richard L. VanAuken, Bridgewater, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed May 27, 1977, Ser. No. 801,028

Int. Cl.[2] B32B *5/12;* **F16C** *1/02*

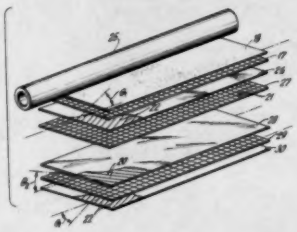
U.S. Cl. 428—36 **9 Claims**

1. A tubular composite rotor shaft structure for transmitting substantial torsion, tension and compression loads comprising:

a cylindrical tubular metal core;

a layer of structural metal adhesive on the exterior surface of the metal core;

a plurality of superimposed layers of resin impregnated unidirectional continuous reinforcing fibers circumferentially wrapped around said tubular metal core, each layer of said resin impregnated reinforcing fibers being generally quadrangular in shape, each layer of said resin impregnated fibers having the fibers oriented at an angle of between about 5° to 12° with respect to the longitudinal axis of the tubular metal core and in opposite orientation with respect to the next preceding layer of said resin impregnated fibers;



a layer of woven fiberglass cloth interposed between each superimposed layer of said resin impregnated reinforcing fibers; and

a layer of woven fiberglass cloth interposed between said layer of structural metal adhesive and said superimposed layers of said resin impregnated reinforcing fibers.

4,173,671
FLAME RETARDANT CARPET AND METHOD FOR PREPARING SAME

Pritam S. Minhas, Mendham, N.J., and Bernard Sukornick, Williamsville, N.Y., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Dec. 19, 1977, Ser. No. 861,778

Int. Cl.[2] B32B *3/02, 33/00*

U.S. Cl. 428—85 **35 Claims**

1. A flame-retardant carpet having a relatively pliable primary backing and a tufted surface, said surface being comprised of fibers selected from the group consisting of polyester and polyamide fibers, said carpet having from about 1 to about 15 weight percent of a composition added thereto, said composition comprising:

(a) about 10 to about 80 weight percent of a polyvalent metal compound selected from the group consisting of the dispersible and soluble salts, oxides and hydroxides of aluminum, antimony and the alkaline earth metals;

(b) about 5 to about 85 weight percent of boric acid; and

(c) 0 to about 85 weight percent of a hydroxy carboxylic acid selected from the group consisting of maleic acid, citric acid, tartaric acid, gallic acid and 2,4-dihydroxybenzoic acid.

4,173,672
DECORATED SAFETY GLASS

Jose R. Mannheim, Avda. La Pradera 164, Lima, Peru

Filed Sep. 6, 1977, Ser. No. 830,879

Int. Cl.[2] B32B *3/10;* **B44C** *1/18*

U.S. Cl. 428—203 **14 Claims**

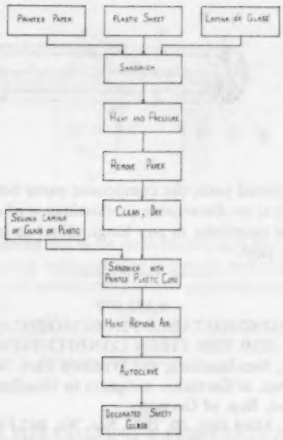
1. A method of manufacturing decorated colored glass comprising the following steps:

(a) transferring, with heat and pressure, a color impression from a printed cellulosic support into an adhesive plastic polyvinyl butyral film spread on a lamina of glass for a time period sufficient for the film to become semi-fluid and for the colorants to permeate the entire thickness thereof;

(b) removing the cellulosic support when the color impression has been transferred from the cellulosic layer into the polyvinyl butyral film and when said film has been permanently adhered to said lamina of glass;

(c) placing a second lamina over the decorated polyvinyl butyral film, in direct contact with it; and

(d) laminating these two lamina and said interposed deco-



rated film at a pressure ranging from 25 psi to 850 psi and at a temperature ranging from 70° C. to 350° C.

12. The product of the method of claim 1, wherein said product is transparent.

4,173,673

DOT-ETCHABLE MASKS FROM PHOTOPOLYMERIZABLE ELEMENTS

Martin D. Bratt, Old Bridge, and Abraham B. Cohen, Springfield, both of N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 741,039, Nov. 11, 1976, which is a continuation-in-part of Ser. No. 632,726, Nov. 17, 1975, abandoned. This application Jun. 1, 1977, Ser. No. 802,511

Int. Cl.[2] **G03C** *5/00, 1/68*

U.S. Cl. 428—217 **14 Claims**

1. A dot-etchable mask prepared by imagewise exposing to actinic radiation a photopolymerizable element which comprises a transparent support bearing an addition photopolymerizable layer which is the outermost layer of the element or is contiguous to a removable cover sheet or an overcoat layer which is at least partially soluble in or permeable to a solvent for the photopolymerizable layer, said photopolymerizable layer being no more than 0.015 mm thick, and removing unexposed areas of the layer, said mask containing a tone correctable image comprised of polymeric dots having a hardened upper skin which rests on a softer undervolume having a lesser degree of polymerization or hardening, said dots having an optical density greater than 3.0 in the 350–400 nm region and being reducible in size by undercutting the polymeric dots with a solvent for the softer undervolume and removing hardened polymer from the edges of the hardened upper skin by mechanical action on the image bearing surface of the mask.

4,173,674

DIELECTRIC INSULATOR SEPARATED SUBSTRATE FOR SEMICONDUCTOR INTEGRATED CIRCUITS

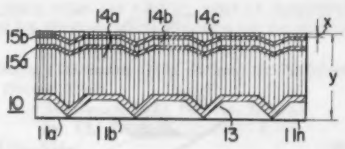
Akio Mimura; Takaya Suzuki, and Seturo Yagiyu, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 680,882, Apr. 27, 1976, abandoned. This application Mar. 22, 1978, Ser. No. 888,981

Claims priority, application Japan, May 12, 1975, 50-54585

Int. Cl.[2] **B32B** *7/00, 9/04;* **H01L** *21/304, 21/316*

U.S. Cl. 428—220 **3 Claims**



1. A dielectric insulator separated substrate for semiconductor integrated circuits comprising a plurality of monocrystalline semiconductor island regions in which circuit elements are to be formed; and a support region in contact with said island regions through a dielectric film, said support region comprising alternately laminated multiple layer structure of polycrystalline semiconductor layers and at least one oxygen diffusion preventive film, said island regions being electrically isolated from each other by said dielectric film, wherein the extreme outer layer of said support region is composed of a polycrystalline semiconductor layer and has a highly polished flat surface, the thickness of said extreme outer polycrystalline semiconductor layer being represented by the formula,

$$x \leqq y/40,$$

where x represents the ultimate thickness of said extreme outer polycrystalline semiconductor layer, and y represents the entire thickness of said dielectric insulator separated substrate of 200–500 microns.

4,173,675

METHOD FOR COLORING OR DYING FIBROUS SHEETS IMPREGNATED WITH BITUMINOUS MATERIAL

Roger Vallon; André Herdenberger, both of Rouen, and Marc Delhomelle, Elbeuf, all of France, assignors to Societe Anonyme dite: Omnium Francais Industriel et Commercial (O.F.I.C.), Paris, France

Filed May 26, 1977, Ser. No. 800,810

Claims priority, application France, May 28, 1976, 76 16263

Int. Cl.[2] **B05D** *1/12;* **B32B** *11/02, 11/62;* **D06N** *5/00;* **D06P** *1/673*

U.S. Cl. 428—291 **14 Claims**

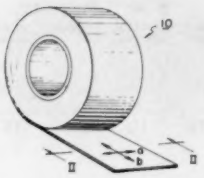
1. Coloured or dyed material formed from a substrate impregnated with bitumen, said material being characterized by a colour gradient between surface and the inside of the substrate, the colour intensity decreasing continuously and practically regularly from the surface.

5. Method for producing a coloured roofing, siding or sealing material, based on cellulose fibers, cardboard or other fibrous material inpregnated with bitumen, comprising coating at least one of the surfaces of the material to be treated with a colouring composition, drying the coated material, and impregnating the thus coated material in a conventional hot bitumen bath.

4,173,676
ADHESIVE TAPE

Hiroshi Asakura; Ippei Chimura; Keisuke Kitazume; Yoshiyuki Kaneko; Shirou Fuse, and Akio Ueno, all of Kamakura, Japan, assignors to Toyo Kagaku Kabushiki Kaisha, Kanagawa, Japan

Filed Nov. 10, 1977, Ser. No. 850,218
Claims priority, application Japan, Dec. 28, 1976, 51-157575; Apr. 30, 1977, 52-49077
Int. Cl.[2] B32B *7/10*; C09J *7/02*
U.S. Cl. 428—332 **5 Claims**



1. An adhesive tape comprising a film of high density polyethylene having a density of not less than 0.94 g/cc elongated six to sixteen times only transversely to the longitudinal direction of the tape and a layer of pressure sensitive adhesive applied at least on one side of said elongated film of high density polyethylene, said film of high density polyethylene having a thickness of 30 to 60μ.

4,173,677
ELECTRO-THERMOSENSITIVE RECORDING MATERIALS

Shiro Nakano, Suita, and Masahiro Hotta, Osaka, both of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jun. 17, 1977, Ser. No. 807,724
Claims priority, application Japan, Jun. 21, 1976, 51/73488; May 10, 1977, 52/53899
Int. Cl.[2] B41M *5/18, 5/20*; B32B *27/30*
U.S. Cl. 428—335 **17 Claims**

1. An electro-thermosensitive recording material comprising:

(1) a support at least the surface of which is electrically conductive, and

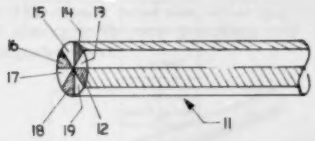
(2) a conductive recording layer formed on the conductive surface of the support, said conductive recording layer containing (a) a film-forming polymer selected from the group consisting of polyvinyl chloride and copolymers of not less than 70 mol % of vinyl chloride, and (b) dispersed in the film-forming polymer, an acid-sensitive leuco dye and at least one zinc compound selected from the group consisting of zinc oxide, zinc hydroxide, zinc sulfide, zinc carbonate, zinc acrylate, zinc stearate and zinc oxide doped with a different metal selected from the group consisting of aluminum, titanium, gallium, germanium, indium, tin, antimony and iron.

4,173,678
COLOR BLENDED YARNS WITH ENHANCED LUMINOSITY

John H. Hennes, Anderson, and Christopher P. Crecente, Mauldin, both of S.C., assignors to Badische Corporation, Williamsburg, Va.

Filed Jul. 24, 1978, Ser. No. 927,697
Int. Cl.[2] D02G *3/00*
U.S. Cl. 428—364 **4 Claims**

1. A non-twisted, non-commingled, draw-textured, multicolored yarn, which yarn has a total denier of from 1000 to 4000 and comprises from 4 to 16 discrete component yarns of a particular coloration or dye receptivity longitudinally disposed in a side-by-side registration, each component yarn having a denier of about 250 and comprising a multiplicity of continuous filaments of about 10 to 20 denier/filament all of which have the same coloration or dye receptivity, there being from 2 to 8 different colorations or dye receptivities present in



the multi-colored yarn, the component yarns being positioned so that there is no discernable predominance of a single coloration or dye recptivity in any longitudinal or transverse segment of the yarn.

4,173,679
LIQUID THERMOSTABLE PHOSPHORIC ACID ESTERS FOR THE FIBER CONDITIONING

Rolf Kleber, Neu-Isenburg, and Winfried Ehrl, Neuotting, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 20, 1977, Ser. No. 862,516
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1976, 2658862
Int. Cl.[2] C07F *9/02*; C11C *3/00*; A23J *7/00*
U.S. Cl. 428—375 **3 Claims**

3. A process for the conditioning of fibers and filaments during their synthesis and processing which consists of applying onto the fibers or filaments a reaction product of polyphosphoric acid and an oxalkylate of C_{8-18} alkyl- or alkenylcarboxylic acids with 1 to 22 ethylene oxide units and having a content of free polyethylene glycol of less than 2% by weight, the reaction product being present in acidic form or in the form of its alkali metal salts.

4,173,680
HOT MELT SIZING COMPOSITIONS AND FIBROUS ARTICLES SIZED THEREWITH

Raymond N. Vachon, and Richard L. McConnell, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 794,181, May 5, 1977, Pat. No. 4,136,069, which is a continuation of Ser. No. 597,122, Jul. 18, 1975, abandoned. This application Oct. 27, 1978, Ser. No. 955,291
Int. Cl.[2] D06M *15/14*
U.S. Cl. 428—375 **8 Claims**

1. A textile fiber sized with a composition comprising: a blend of about 35–80 weight percent of at least one member of the group consisting of copolymers of ethylene and α,β-unsaturated carboxylic acids containing 75–90 weight percent ethylene and having a melt viscosity of about 10,000 to 200,000 cp. at 190° C. and about 5 to 50 weight percent of at least one member of the group consisting of copolymers of ethylene and α,β-unsaturated carboxylic acids containing about 80–95 weight percent ethylene and having a melt viscosity of about 1500 cp. to 100 cp. at 140° C.

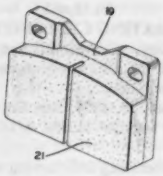
4,173,681
BRAKE PAD WITH INTEGRAL ORGANIC BACKPLATE

Jean-Pierre Durrieu, Noyon, and Guy Pomes, Margny-les-Compiegne, both of France, assignors to Societe Abex Pagid Equipement S.A., Clichy, France

Filed Jul. 19, 1978, Ser. No. 926,050
Claims priority, application France, Jul. 25, 1977, 77 22752
Int. Cl.[2] F16D *69/02*; B32B *19/02, 19/06*
U.S. Cl. 428—409 **4 Claims**

1. A disc brake pad comprising an organic friction material

layer and an organic backplate material layer integral therewith, characterized in that the backplate layer is an unbaked preform of compacted pulverulent material, the friction layer is an unbaked preform of compacted pulverulent material, each



preform containing the same resin binder, and the brake pad is formed by placing both preforms in a mold and simultaneously applying heat and pressure to join the preforms into an integral disc brake pad.

4,173,682

PROCESS FOR COATING A SUBSTRATE WITH A RADIATION AND MOISTURE CURABLE COATING COMPOSITION

Arie Noomen, Voorhout; Johannes M. P. van der Geest; Cornelis de Jong, both of Sassenheim, and Dick Van Santen, Leimuiden, all of Netherlands, assignors to Akzo N.V., Arnhem, Netherlands

Filed Mar. 8, 1978, Ser. No. 884,588

Claims priority, application Netherlands, Mar. 9, 1977, 7702518

Int. Cl.[2] B05D *3/06*

U.S. Cl. 428—423 **12 Claims**

1. A process for coating a substrate by applying to it a radiation curable coating composition based on a urethane compound and subjecting it to radiation have a wavelength of 90 to 600 nm, characterized in that a composition comprising (A) an at least one isocyanate group-containing adduct of (a) an acrylic or methacrylic hydroxy ester with 5 to 20 carbon atoms and (b) a polyisocyanate with 4 to 40 carbon atoms and with 2 to 4 isocyanate groups per molecule, (B) a polyfunctional hydroxy compound having a molecular weight of 178 to 12,000 and a hydroxyl content of 0.5 to 30% by weight in an amount of 0.5 to 1.5 equivalents of hydroxy per equivalent of isocyanate of component A, and (C) a photoinitiator in an amount of 0.1 to 10% by weight of component A, is applied to the substrate, and the coating layer is subjected to radiation and mainly after radiation the adduct is reached with water vapour.

4,173,683

CHEMICALLY TREATING THE OVERCOAT OF A SEMICONDUCTOR DEVICE

Robert B. Comizzoli, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 806,286, Jun. 13, 1977, abandoned. This application Apr. 6, 1978, Ser. No. 894,013

Int. Cl.[2] H01L *21/56, 23/30*

U.S. Cl. 428—447 **4 Claims**

1. In a method of manufacturing a semiconductor device wherein a passivating overcoat of insulating material is disposed over said device prior to encapsulating said device with a packaging material selected from the group consisting of plastic, metal, ceramic and glass, the improvement comprising treating said overcoat with an organosilane as the step immediately prior to said encapsulating step, said organosilane containing an organic functional group remaining after said treatment, said functional group being free of one or more atoms selected from the group consisting of nitrogen, oxygen and fluorine.

4,173,684

PRODUCTION OF NOVEL METAL MODIFIED NOVOLAK RESINS AND THEIR USE IN PRESSURE SENSITIVE PAPERS

John J. Stolfo, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Sep. 6, 1977, Ser. No. 830,993

Int. Cl.[2] B32B *27/10*; C08G *8/04*

U.S. Cl. 428—531 **20 Claims**

1. A metal modified novolak resin, said metal modified novolak resin being an electron acceptor suitable for use in a pressure-sensitive copy system and being co-reactive with color precursors of the electron donor type, said metal modified novolak resin being further characterized by compatability with the surface properties of a paper substrate, said metal modified novolak resin comprising a reaction product of a novolak resin and a metal alkanoate salt of an alkanoic acid having 1 to 3 carbon atoms, the metal being selected from the group consisting of copper, zinc, cadmium, aluminum, indium, tin, chromium, cobalt and nickel, said novolak resin being a reaction product in the presence of an acid catalyst of a mixture consisting essentially of:

(a) a para-substituted phenol selected from the group consisting of para-alkylphenols having an alkyl group of from about 1 to about 12 carbon atoms, para-phenylphenol and mixtures thereof;

(b) salicylic acid; and

(c) formaldehyde.

11. A pressure-sensitive paper comprising a paper substrate containing on one surface thereof a coating containing a metal modified novolak resin which is co-reactive with color precursors of the electron donor type comprising a reaction product of a novolak resin and a metal alkanoate salt of an alkanoic acid having 1 to 3 carbon atoms, the metal being selected from the group consisting of copper, zinc, cadmium, aluminum, indium, tin, chromium, cobalt and nickel, said novolak resin being a reaction-product in the presence of an acid catalyst of a mixture consisting essentially of:

(a) a para-substituted phenol selected from the group consisting of para-alkyl phenols having an alkyl group of 1 to about 12 carbon atoms, para-phenylphenol and mixtures thereof,

(b) salicylic acid, and

(c) formaldehyde,

said metal modified novolak resin being compatible with the surface characteristics of said paper substrate.

4,173,685

COATING MATERIAL AND METHOD OF APPLYING SAME FOR PRODUCING WEAR AND CORROSION RESISTANT COATED ARTICLES

Merle H. Weatherly, Indianapolis, Ind., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 23, 1978, Ser. No. 908,623

Int. Cl.[2] B05D *3/06*

U.S. Cl. 428—556 **21 Claims**

1. A powder composition for deposition by a method producing a coating having an as-deposited density greater than 75 percent theoretical on a metal substrate, such coating having high wear and corrosion resistance

comprising two or more components

(a) the first component consisting of 0–25 wt.% of at least one binder taken from the class consisting of cobalt, iron, nickel and alloys thereof and at least one metal carbide taken from the class consisting of tungsten, chromium, vanadium, hafnium, titanium, zirconium, niobium, molybdenum, tantalum carbides, and compounds thereof;

(b) the second component consisting essentially of a single alloy or a mixture of alloys with a total composition of 6.0 to 18.0 wt.% boron; 0–6 wt.% silicon; 0–20 wt.% chromium; 0–5 wt.% iron; balance nickel;

said first component comprising 40–75 wt.% of the entire composition.

10. A method for producing a coating on a metallic substrate, such coating having high wear and corrosion resistance comprising

(a) depositing by a method capable of producing a coating having an as-deposited density greater than 75 percent theoretical, a composition comprising two or more components; the first component consisting of 0–25 wt.% of at least one binder taken from the class consisting of cobalt, iron, nickel and alloys thereof and at least one metal carbide taken from the class consisting of tungsten, chromium, vanadium, hafnium, titanium, zirconium, niobium, molybdenum, tantalum carbides, and compounds thereof; the second component consisting essentially of a single alloy or a mixture of alloys with a total composition of 6.0 to 18.0 wt.% boron; 0–6 wt.% silicon; 0–20 wt.% chromium; 0–5 wt.% iron; balance nickel; said first component comprising 40–75 wt.% of the entire composition;

(b) heating such deposited coating at a temperature greater than 950° C. and for a time sufficient to cause substantial melting of said second component and reaction of said second component with a substantial portion of said first component;

(c) cooling the coating allowing the formation of borides, carbides and intermetallic phases resulting in a coating having a hardness greater than 1000 DPH_{300} and being virtually fully dense with no interconnected porosity.

21. A coating on a metallic substrate, said coating consisting of an interdiffusion zone with said substrate, and intermediate zone consisting of a gradient of borides, carbides and intermetallics in a metal matrix and a hard outer zone which may consist of one or more layers, said outer zone containing large, angular borides, carbides and intermetallic particles, and having a hardness of 1000 to 2200 DPH_{300}.

4,173,686

SODIUM SULPHUR CELLS

Michael P. J. Brennan, Helsby, England, assignor to Chloride Silent Power Limited, London, England

Filed Sep. 14, 1978, Ser. No. 942,253

Claims priority, application United Kingdom, Sep. 19, 1977, 39025/77

Int. Cl.[2] H01M *6/20*

U.S. Cl. 429—104 **20 Claims**

1. A sodium sulphur cell in which a solid electrolyte separates sodium from a cathodic reactant, wherein there is provided a cathode current collector in contact with the cathodic reactant, which current collector comprises a substrate of a first metal which, at least on its surface exposed to the cathodic reactant, has a protective coating of a material chemically and electrically inert to the cathodic reactant, and at least one element of a second metal bonded through the protective coating onto the substrate to be in electrical contact therewith, said element being exposed to the cathodic reactant and being formed of a metal which is either chemically and electrochemically resistant to attack by the cathodic reactant or is coated with a corrosion resistant electronically conductive coating.

4,173,687

CURRENT GENERATING CELL WITH ALLOY ANODE

James P. McKaveney, Claremont, and Martin A. Prieto, Diamond Bar, both of Calif., assignors to Occidental Research Corporation, Irvine, Calif.

Filed Jun. 20, 1978, Ser. No. 917,167

Int. Cl.[2] H01M *4/36*

U.S. Cl. 429—218 **31 Claims**

1. In a current generating cell having an anode, a cathode, and an electrolyte capable of electrochemically reacting with the anode and cathode to generate current, the improvement which comprises providing as the anode, an anode composition comprising from about 20 to about 90 weight percent of a first constituent selected from the group consisting of iron and silicon and at least about 10 weight percent of a second constituent selected from the group consisting of molybdenum, tungsten, vanadium, niobium, titanium, phosphorus, and silicon wherein said composition is in direct contact with the electrolyte for electrochemically reacting with said electrolyte.

4,173,688

PROCESS FOR PREPARING STYRENIC POLYMER FOAMS

Fumio Saito, Ohtsu; Fumito Yamai, Kusatsu; Yositugu Beppu, Shiga, and Shinpei Nakayama, Kusatsu, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka and Sekisui Kasehin Kogyo Kabushiki Kaisha, Nara, both of, Japan

Division of Ser. No. 617,624, Sep. 29, 1975, Pat. No. 4,085,169, which is a continuation of Ser. No. 381,460, Jul. 23, 1973, abandoned. This application Jan. 11, 1978, Ser. No. 868,592

Int. Cl.[2] C08J *9/02*

U.S. Cl. 521—56 **10 Claims**

1. A process for reducing the amount of powdery polymer particles which pass through a 32 mesh sieve to thereby obtain foamable styrenic polymer particles having a uniform particle size of 0.6 to 3 mm by preparing foamable styrenic polymer particles by the suspension polymerization of a system comprising styrenic monomer droplets and styrenic polymer particles using the styrenic monomer and styrenic polymer particles as raw materials, which comprises suspending styrene homopolymer particles or copolymer particles of styrene monomer and up to 50% by weight of a different copolymerizable ester monomer comprising an alkyl alcohol having from 1 to 12 carbon atoms and being selected from the group consisting of acrylic esters, methacrylic esters, maleic esters and fumaric esters, having particle sizes of 0.4 to 1.8 mm in water containing a suspending agent selected from the group consisting of a water-soluble high molecular weight material and a slightly soluble inorganic material and adding to the suspension styrene monomer with up to 50% by weight of a different copolymerizable monomer selected from the group consisting of methylacrylate, ethylacrylate, butylacrylate, methylmethacrylate, ethylmethacrylate, dimethylmaleate, diethylmaleate, acrylonitrile, β-methylstyrene, divinylbenzene and mixtures thereof, a suspension polymerization catalyst, and a polymerization retarder which is soluble in the styrene monomer and which has a molecular weight of at least 200, said retarder being selected from the group consisting of 3,5-di-tertiary butyl-4-hydroxytoluene, 1,1-bis(4-hydroxy-phenyl)cyclohexane, 4,4'-butylidene-bis(3-methyl-6-tertiary butyl phenol), 1,3,5-trimethyl-2,4,6-tris-3,5-di-tertiary-butyl-4-hyroxybenzylbenzene, 2,2'-methylenebis(6-tertiary-butyl-4-methylphenol, dilaurylthiodipropionate, 4,4'-thiobis(3-methyl-6-tertiary-butylphenol),

N,N'-di-β-napthyl-p-phenylenediamone, and N-phenyl-N-isopropyl-p-pheylenediamine in an amount of 1/100 to 1/25 mol per mol of said suspension polymerization catalyst to conduct the polymerization of said styrenic monomer while absorbed in said polymer particles, whereby the size of said polymer particles is increased, said polymerization retarder retarding the polymerization of said styrenic monomer droplets until said styrenic monomer is absorbed by said polymer particles, the amount of said polymer and said monomer used as raw material being 5 to 60 weight % and 95 to 40 weight %, respectively, of the polymer particles produced, said polymerization being conducted in the presence of a foaming agent which does not dissolve the styrenic polymer particles or only slightly swells the styrenic polymer particles to thereby obtain styrenic polymer particles having a uniform particle size of 0.6 to 3 mm.

4,173,689

SYNTHETIC POLYMER PROSTHESIS MATERIAL

Donald J. Lyman, and Frank J. Fazzio, both of Salt Lake City, Utah, assignors to University of Utah, Salt Lake City, Utah

Filed Feb. 3, 1976, Ser. No. 654,831
Int. Cl.[2] C08G *18/14*; A61F *1/24*
U.S. Cl. 521—64 **22 Claims**

1. A method of fabricating a prosthesis material for use with a living body, said prosthesis having mechanical properties of compliance and elasticity approximating that of soft body tissue and being operable to preserve surface properties of blood and tissue compatibility, said method comprising the steps

(a) preparing a copolyurethane composition having a molecular weight range approximately corresponding to an inherent viscosity of 0.4 to 1.0 as measured in a solution of 0.5% concentration in N,N-dimethylformamide at 30° C.;

(b) dissolving an amount of said copolyurethane composition in solvent to produce a dipping solution having 5–12% by weight polymer concentration, said solution having a relative viscosity between the range of 100 to 1000 at a dipping temperature of 10° C. to 60° C.;

(c) coating forming means with a uniform thickness of said dipping solution; and

(d) precipitating said coating into a stable physical structure having a substantially uniform dispersion of voids throughout the copolyurethane composition by immersing said coated forming means into a precipitating solution comprising a fluid which is miscible in said solvent but operable as a precipitating nonsolvent with respect to the said copolyurethane composition, the precipitation being accomplished by means of a balanced rate of exchange between said solvent and nonsolvent molecules which prevents any substantial shrinkage of said coating during precipitation and fixes said copolyurethane composition in a stable physical structure.

4,173,690

METHOD OF PRODUCING ELECTRICAL INSULATION FOAM

Bernard G. Giessner, Sicklerville, N.J.; David H. Reighter, Roslyn, Pa., and Allen E. Stringfellow, Haddonfield, N.J., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Dec. 2, 1977, Ser. No. 856,637
Int. Cl.[2] C08J *9/22*
U.S. Cl. 521—89 **5 Claims**

1. In a method of producing an electrical insulator foam by mixing a hardenable plastic forming material with a molecular sieve having sulfur hexafluoride adsorbed therein and then subjecting the mixture to sufficient heat to cause the hardenable plastic forming material to harden and to cause the sulfur hexafluoride to desorb from the molecular sieve, the improvement which comprises forming said mixture by first mixing said sieve with a part of said plastic forming material sufficient to wet said sieve under low shear mixing conditions, the weight ratio of sieve to said part of said plastic forming material being about 2:1 to about 1:2, and then mixing said wet sieve with additional plastic forming material under low shear conditions, wherein said low shear mixing conditions are such that the mixing apparatus are rotating at a speed low enough so that the stirring edge will not exceed a peripheral speed of 600 feet per minute.

4,173,691

CATALYST COMPOSITION FOR FLEXIBLE POLYURETHANE FOAMS

Kenneth Treadwell, Rahway, N.J., assignor to M&T Chemicals Inc., Stamford, Conn.

Filed Feb. 21, 1978, Ser. No. 879,633
Int. Cl.[2] C08G *18/24*
U.S. Cl. 521—124 **18 Claims**

1. In an improved composition for preparing a flexible polyurethane foam, said composition comprising a polyol having two or three active hydrogen atoms as determined by the Zerewitinoff method, water, a difunctional isocyanate in an amount sufficient to react with substantially all of the polyol and water present in said composition, an effective amount of an organopolysiloxane surfactant, a catalytically effective amount of a gel catalyst of the general formula

$$Sn(OCR^1)_2$$

wherein R^1 is alkyl and contains from 1 to 19 carbon carbon atoms and a catalytically effective amount of a blowing catalyst, the improvement which resides in the presence in said composition, as the blowing catalyst, of an antimony compound of the formula

$$Sb(OCR^2)_3$$

and a potassium salt of the formula

$$KOCR^3,$$

wherein R^2 and R^3 are individually selected from the same group as R^1.

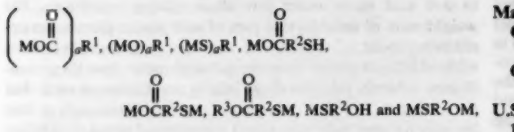
4,173,692

METHOD FOR PREPARING URETHANE-MODIFIED ISOCYANURATE FOAMS

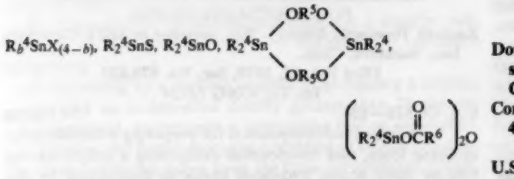
William J. Eldridge, Berkeley Heights, N.J., assignor to M&T Chemicals Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 797,445, May 16, 1977, abandoned, which is a continuation of Ser. No. 613,964, Sep. 16, 1975, abandoned. This application Oct. 25, 1978, Ser. No. 954,447
Int. Cl.[2] C08J *9/00*
U.S. Cl. 521—125 **5 Claims**

1. In an improved method for preparing urethane-modified isocyanurate foams by reacting a polyfunctional isocyanate with a polyol in the presence of a catalytically effective amount of a catalyst for the reaction, wherein the improvements comprise reacting from 6 to 14 equivalent weights of said polyfunctional isocyanate for each equivalent of polyol and conducting the reaction in the presence of a catalyst composition consisting essentially of (1) an alkali metal salt exhibiting a general formula selected from the group consisting of



and (2) between 5 and 50%, based on the weight of said salt, of a tin compound exhibiting a formula selected from the group consisting of



and SnX_2, wherein M is an alkali metal, a is 1 or 2, R^1 is alkyl containing between 1 and 20 carbon atoms, alkenyl containing between 2 and 20 carbon atoms, cycloalkyl, aryl, alkaryl or aralkyl when a is 1 or R^1 is alkylene, arylene or alkylidene and contains between 2 and 20 carbon atoms when a is 2, R^2 and R^5 each represent identical or different alkylene radicals containing between 2 and 20 carbon atoms, R^3, R^4 and R^6 are individually selected from the group consisting of alkyl radicals containing between 1 and 20 carbon atoms, cycloalkyl, aryl, alkaryl and aralkyl radicals, b is zero or the integer 1, 2 or 3 and X is selected from the group consisting of halogen atoms and radicals of the formula R^7COO—, R^7S— and $R^7OOC(CH_2)_nS$—, wherein R^7 is selected from the same group as R^3 and n is 1 or 2.

4,173,693

POLYMER-SUPPORTED POLY(ALKYLENEGLYCOL ETHERS)

Andrew T. Au, Newton, and Harold H. Freedman, Newton Center, both of Mass., assignors to The Dow Chemical Company, Midland, Mich.

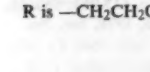
Filed Jan. 12, 1978, Ser. No. 868,942
Int. Cl.[2] C08F *8/00, 8/18*
U.S. Cl. 525—329 **13 Claims**

1. A compound of the formula

wherein:

Ⓟ is a polymer matrix of sufficient structure and molecular weight so as to be substantially water- and hydrocarbon-insoluble;

R is $-CH_2CH_2O-$, $-CH_2CH_2CH_2O-$,



$-CH_2CH_2CH_2CH_2O-$ or a combination thereof;

R^1 is hydrogen, hydrocarbyl or an inertly-substituted hydrocarbyl;

n is an integer of 3 to about 40; and

m is a real number such that the weight percent of $-(O-(R-)_nR')$ groups is at least about 1 percent of the total weight of the compound.

4,173,694

POLYCHLOROPRENE RUBBER COMPOSITION

Masaaki Inagami, Kamakura, Japan, assignor to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1978, Ser. No. 923,584
Claims priority, application Japan, Jul. 22, 1977, 52-88006
Int. Cl.[2] C08K *5/37;* C08J *3/24;* C08F *8/34, 8/32*
U.S. Cl. 525—351 **3 Claims**

1. A polychloroprene rubber composition comprising 100 parts by weight of a polychloroprene rubber, 0.1 to 3 parts by weight of a di- or tri-mercapto-s-triazine compound, and 0.1 to 2 parts by weight of a polyalkylene polyamine.

4,173,695

ALKYL AMMONIUM IONOMERS

Douglas Brenner, Livingston, and Alexis A. Oswald, Mountainside, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 788,312, Apr. 18, 1977, Pat. No. 4,102,876. This application Jul. 17, 1978, Ser. No. 924,966
Int. Cl.[2] C08G *75/00;* C08L *19/00*
U.S. Cl. 526—332 **32 Claims**

1. Polymers having the general formula:

$$[C—A^-]_{p+1}\ R_3N^+-[-Q—R_2N^+-]_pR$$

wherein C is one of a plurality of carbon atoms comprising a portion of the polymer backbone chain of carbon atoms or is in an acyclic, alicyclic or aromatic radical which is pendant to the backbone chain and wherein said C is in a single polymer molecule; A^- is an anionic radical covalently bonded to one or more of said C carbon atoms; and wherein the R groups represent substituents of the nitrogen atom(s) which are each independently selected from the group comprising hydrogen or C_1 to C_{50} straight and branched chain acyclic, alicyclic, aryl, alkylaryl, and arylalkyl radicals and substituted functional derivatives thereof, wherein at least one of the R groups is selected from the group comprising C_{12} to C_{50} straight and branched chain acyclic, alicyclic, aryl, alkylaryl, and arylalkyl radicals and substituted functional derivatives thereof, and wherein each Q is independently selected from the group comprising C_1 to C_{40} divalent straight and branched chain alkylene, cycloalkylene, arylene, dialkylene-arylene radicals and substituted functional derivatives thereof and $—(CHY)_n—Z_m—(CHY)_n$, wherein Z is a hetero atom selected from the group consisting of oxygen and sulfur, m is zero or one, Y is hydrogen or said C_1 to C_{50} radicals or substituted functional derivatives of said radicals and n is an integer of from 1 to 10, wherein p is from zero (for a monoammonium counterion) to about 10, and wherein said ammonium counterion at least partially neutralizes said anionic acid radicals.

4,173,696

METHOD FOR THE POLYMERIZATION OF VINYL MONOMERS

Shunichi Koyanagi, Ibaragi; Niichiro Hasegawa, Joetsu; Toshihide Shimizu, Joetsu; Sensaku Katusima, Joetsu, and Ichiro Kaneko, Joetsu, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan

Filed Jan. 23, 1978, Ser. No. 871,249
Claims priority, application Japan, Jan. 25, 1977, 52-7100; Nov. 11, 1977, 52-135356; Nov. 24, 1977, 52-140989
Int. Cl.[2] C08F *2/02, 2/18, 2/22*
U.S. Cl. 526—62 **23 Claims**

1. In a method for the polymerization of a vinyl monomer or a mixture of vinyl monomers, said polymerization being conducted in a polymerization reactor having a surface in contact with said monomer or mixture of monomers, the improvement which comprises the steps of (i) coating said surface, prior to the polymerization, with an aqueous coating liquid obtained by acidifying an alkaline aqueous solution containing a solution for a colloidal dispersion of at least one member selected from the group consisting of alkali metal salts and ammonium salts

of water-soluble anionic dyes of the sulfonic acid form or carboxylic acid form to have a pH value not exceeding 7 by use of a pH adjusting agent, and (ii) drying the thus coated surface.

4,173,697

CONTINUOUS HIGH PRESSURE MASS PROCESSES FOR THE POLYMERIZATION OF ETHYLENE

Ronald E. Gilbert, Katy; Thomas J. Lynch, Houston, and Robert J. Rowatt, Orange, all of Tex., assignors to Gulf Oil Corporation, Pittsbrugh, Pa.

Continuation-in-part of Ser. No. 838,777, Oct. 3, 1977, abandoned, which is a continuation-in-part of Ser. No. 835,267, Sep. 21, 1977, abandoned. This application May 19, 1978, Ser. No. 907,517

The portion of the term of this patent subsequent to Jun. 19, 1996, has been disclaimed.

Int. Cl.[2] C08F *4/28, 10/02*

U.S. Cl. 526—74 **8 Claims**

1. In a continuous high pressure process for the mass polymerization of ethylene in which ethylene and a free radical generating polymerization initiator are fed continuously to a polymerization zone operating at an elevated temperature and at a pressure of at least about 1,000 atmospheres; the improvement which consists essentially of feeding the polymerization initiator to the polymerization zone on a continuous basis by pumping a Bingham fluid composition into the polymerization zone, said Bingham fluid composition being a solid at ambient temperature and consisting essentially of a free-radical generating polymerization initiator uniformly dispersed in a continuous solid phase which consists essentially of an intimate mixture of a wax and a liquid hydrocarbon.

4,173,698

POLYMERIZATION OF OLEFIN

Natsuki Kanoh, Sagamihara; Toru Tanaka, Komae, and Atsushi Murakami, Machida, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed May 25, 1977, Ser. No. 800,179

Claims priority, application Japan, Jun. 22, 1976, 51/73672

Int. Cl.[2] C08F *4/68, 10/02*

U.S. Cl. 526—142 **5 Claims**

1. In a process for polymerizing ethylene alone or a mixture containing ethylene and a different α-olefin to form copolymers containing less than 10 wt.% of the α-olefin in the presence of a catalyst system comprising an organoaluminum compound and a solid catalytic component, the improvement which comprises preparing said solid catalytic component by the process which comprises:

(a) dissolving a vanadium trichloride-ether complex in a solvent to form a solution;

(b) adding to said solution a quantity of an aluminum halide sufficient to yield a molar ratio of aluminum halide to the ether in the vanadium trichloride-ether complex of 0.1 to 10, whereby said aluminum halide reacts with said vanadium trichloride-ether complex to form a precipitate consisting essentially of said solid catalytic component; and

(c) recovering said solid catalytic component.

4,173,699

PROCESS FOR MANUFACTURING PETROLEUM RESINS FOR ADHESIVE THERMOFUSIBLE COMPOSITIONS

Patrick Borg, Rueil-Malmaison, France, assignor to Ato Chimie, Courbevoie, France

Filed Mar. 10, 1978, Ser. No. 885,283

Claims priority, application France, Mar. 11, 1977, 77 07324

Int. Cl.[2] C08F *240/00*

U.S. Cl. 526—237 **8 Claims**

1. A process for preparing petroleum resins for use in thermofusible adhesive compositions, which comprises the steps of polymerizing a C_5 hydrocarbon cut which contains less than 5% of isoprene and less than 1% of cyclopentadiene, in a hydrocarbon solvent having a boiling point in the range of between 20° and 150° C., in the presence of a Friedel-Crafts catalyst at a temperature in the range of between 20° and 150° C. whereby an organic reaction mixture comprising the polymerized resin is obtained, washing the organic reaction mixture with an alkaline or acid solution, then with water until neutralization at a temperature in the range of between 70° and 100° C. and submitting the washed organic reaction mixture to a distillation carried out by progressively raising the temperature to 250° C. in order to eliminate the hydrocarbon solvent, and to recover a product having a softening point of between 60° and 110° C., and a Gardner color index of less than 9.

4,173,700

BIS (DIFLUOROMALEIMIDE) CAPPED PROPOLYMERS AND POLYMERS

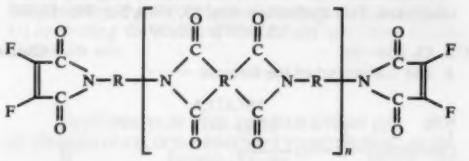
Howard E. Green, Seal Beach; Robert J. Jones, Hermosa Beach, and Michael K. O'Rell, Manhattan Beach, all of Calif., assignors to TRW Inc., Cleveland, Ohio

Filed Jun. 21, 1978, Ser. No. 917,602

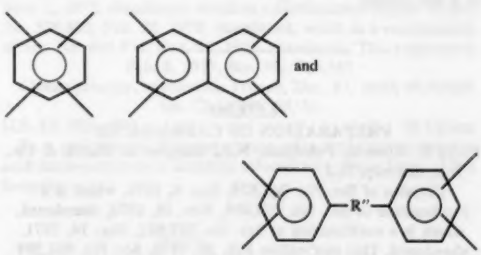
Int. Cl.[2] C08G *73/10*

U.S. Cl. 528—125 **8 Claims**

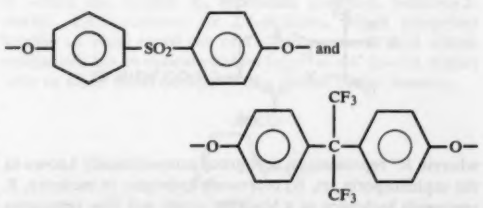
1. Thermally curable prepolymers of the formula:



wherein n has a value from 0 to about 3, each R is independently an aromatic radical and R′ is a tetra functional radical selected from the group consisting of:



wherein R″ is a difunctional radical selected from the group consisting of —SO_2—, —O—, —S—, —CO—,



4,173,701

SPEAKER DIAPHRAGM MOLDED FROM POLY-BIPHENOL PHTHALATE TYPE RESIN FILM

Kosaku Murata, Kobe; Satoshi Takayama, Moriguchi, and Hirotoshi Niguchi, Kashihara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 26, 1977, Ser. No. 836,734
Claims priority, application Japan, Sep. 30, 1976, 51-118110
Int. Cl.[2] G10K *13/03*
U.S. Cl. 528—194 3 Claims

1. A speaker diaphragm having a lowest resonant frequency of about 300 to 400 Hz, molded from a poly-bisphenol phthalate type resin film having ester linkages prepared from an aromatic dicarboxylic acid selected from isophthalic acid, terephthalic acid and a mixture thereof and a bifunctional phenol, wherein said film has a specific gravity of about 1.2, an elastic modulus of 9,000 to 13,000 kg/cm^2, and an inner loss of 0.009 to 0.02.

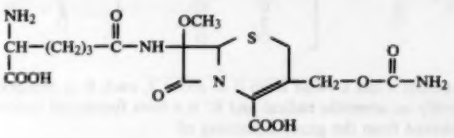
4,173,702

7-(5-AMINO-5-CARBOXYVALER-AMIDO)-3-(CARBAMOYLOXYMETHYL)-7-METHOXY-3-CEPHEM-4-CARBOXYLIC ACID

Marvin Gorman; Calvin E. Higgens, and Ramakrishnan Nagarajan, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 849,395, Aug. 12, 1969, abandoned. This application Aug. 10, 1970, Ser. No. 62,390
Int. Cl.[2] C07D *501/20*
U.S. Cl. 544—21 3 Claims

1. The compound of the formula



or a salt thereof.

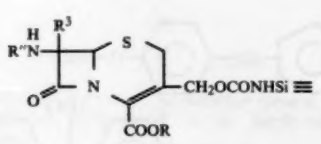
4,173,703

PREPARATION OF CARBAMATES

Floyd E. Roberts, Princeton, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 747,839, Dec. 6, 1976, which is a continuation of Ser. No. 398,495, Nov. 18, 1973, abandoned, which is a continuation of Ser. No. 207,982, Dec. 14, 1971, abandoned. This application Feb. 27, 1978, Ser. No. 881,201
Int. Cl.[2] C07D *501/20*
U.S. Cl. 544—16 3 Claims

1. A compound of the formula



wherein R'' represents an acyl group conventionally known in the cephalosporin art, R_3 represents hydrogen or methoxy, R represents hydrogen or a blocking group and Si≡ represents trimethylsilyl.

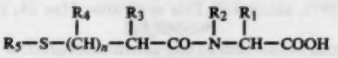
4,173,704

DITHIO AMINOACID DERIVATIVES

Miquel A. Ondetti, Princeton, and David W. Cushman, West Windsor, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 773,864, Mar. 3, 1977, which is a division of Ser. No. 684,606, May 10, 1976, Pat. No. 4,053,651. This application May 26, 1978, Ser. No. 918,881
Int. Cl.[2] C07D *233/64*
U.S. Cl. 548—336 8 Claims

1. A compound of the formula

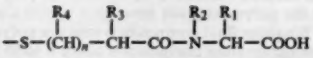


or physiologically acceptable salt thereof, wherein n is 0, 1 or 2;

R_1 is imidazol-4-yl-lower alkylene;

R_2, R_3 and R_4 each is hydrogen, lower alkyl or phenyl-lower alkylene; and

R_5 is



4,173,705

2-(2-FUROYL)-4-METHYLPYRIDINE AND ITS METHYL IODIDE QUATERNARY SALT

Ricardo G. Jarque; Juan B. Cartes; Rosa L. Jimenez, all of Barcelona; Cristobal M. Roldan, and Fernando R. Peinado, both of Madrid, all of Spain, assignors to Laboratorios Made, S.A., Madrid, Spain

Filed Oct. 6, 1978, Ser. No. 949,021
Claims priority, application Spain, Oct. 7, 1977, 462.990
Int. Cl.[2] C07D *405/02*
U.S. Cl. 546—283 6 Claims

1. 2-(2-Furoyl)-1,4-dimethylpyridinium iodide.

2. 2-(2-Furoyl)-4-methylpyridine.

3. A process for preparing 2-(2-furoyl)-1,4-dimethylpyridinium iodide comprising the steps of reacting 2-cyano-4-methylpyridine under a nitrogen atmosphere with an ethereal solution of freshly prepared 2-furyl-lithium, hydrolyzing the reaction mixture under acid conditions to form 2-(2-furoyl)-4-methylpyridine, and heating the 2-(2-furoyl)-4--methylpyridine in the presence of methyl iodide to form 2-(2-furoyl)-1,4-dimethylpyridinium iodide.

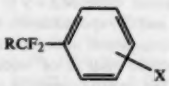
4,173,706

PROCESS FOR PRODUCING FLUORINATED ORGANIC COMPOUNDS CONTAINING A DIFLUOROMETHYLENE GROUP FROM COMPOUNDS COMPRISING AT LEAST ONE CARBONYL FUNCTION

François Mathey, and Jean Bensoam, both of Ballancourt, France, assignors to Institute National de Recherche Chimique Appliquee, Paris, France

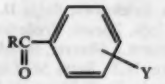
Continuation of Ser. No. 533,272, Dec. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 185,362, Sep. 30, 1971, Pat. No. 3,878,296. This application Apr. 6, 1978, Ser. No. 894,080
Claims priority, application France, Dec. 14, 1973, 7344885
Int. Cl.[2] C07B *9/00*; C07C *87/28, 103/22, 125/06*
U.S. Cl. 560—30 9 Claims

1. Process for preparing an organic compound of the formula



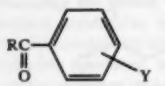
wherein R is H, lower alkyl or phenyl and X is a group capable of reacting with MoF_6 and selected from Lewis bases and groups possessing labile hydrogen atoms,

by fluorinating a starting compound of the formula

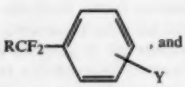


wherein Y is a group incapable of reacting with MoF_6 under the following conditions, but is capable of conversion to X by conventional synthesis, comprising

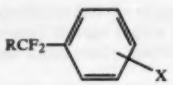
reacting substantially anhydrous MoF_6 with said compound



under anhydrous conditions in solution in an organic solvent inert with respect to the reactants at a temperature of about −20° C. to about +40° C. under an inert atmosphere to obtain the intermediate product



reacting said intermediate product using a conventional organic synthesis to obtain said organic compound



4,173,707

CYCLOPENTANOL DERIVATIVES

Sigeru Torii; Hideo Tanaka, and Yuichi Kobayashi, all of Okayama, Japan, assignors to Otsuka Kagaku Yakuhin Kabushiki Kaisha, Osaka, Japan

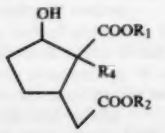
Filed Jun. 8, 1978, Ser. No. 913,689

Claims priority, application Japan, Aug. 12, 1977, 52-97174; Aug. 12, 1977, 52-97175

Int. Cl.[2] **C07C** *69/74*

U.S. Cl. 560—122 **3 Claims**

1. A cyclopentanol derivative represented by the formula



wherein R_1 and R_2 are lower straight-chain or branched-chain alkyl, alkenyl or aralkyl, and R_4 is 2-pentenyl or 2-pentynyl.

4,173,708

PURIFICATION OF 4,4′-BENZOPHENONEDICARBOXYLIC ACID

Louis R. Palmer, Morristown, and James T. Karo, Madison both of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Filed Oct. 31, 1977, Ser. No. 846,758

Int. Cl.[2] **C07C** *65/20*

U.S. Cl. 562—460 **5 Claims**

1. A process for purifying 4,4′-benzophenonedicarboxylic acid, containing aromatic monocarboxylic acid genetic impurity, which comprises the steps of

(a) mixing the impure 4,4′-benzophenonedicarboxylic acid with aqueous ammonium hydroxide solution, containing about 28 weight percent or less of ammonia, in weight ratio of solution to acid of about 5:1 to 100:1 thereby forming an aqueous solution of the ammonium salt of the aromatic dicarboxylic acid;

(b) removing insoluble impurities, if present, from the solution of the ammonium salt of the acid;

(c) mixing the resultant solution with an inert water-soluble organic liquid, containing 1 to 10 carbon atoms and selected from the group consisting of aliphatic nitriles, cycloaliphatic ethers and aliphatic ketones, which is a nonsolvent for the ammonium salt, in a weight ratio of organic liquid to solution not greater than about 20:1, thereby precipitating the ammonium salt of the acid;

(d) separating the ammonium salt from the solution; and

(e) recovering the aromatic dicarboxylic acid from the ammonium salt.

4,173,709

PROCESS FOR THE PREPARATION OF DEXTROROTATORY 2-PHENOXYPROPIONIC ACID DERIVATIVES

Jean Metivier, and Michel Sauli, both of Paris, France, assignors to Rhone-Poulenc S.A., Paris, France

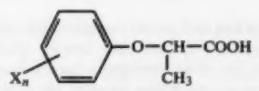
Continuation-in-part of Ser. No. 746,166, Nov. 30, 1977, abandoned, which is a continuation of Ser. No. 497,461, Aug. 14, 1974, abandoned, which is a continuation of Ser. No. 337,006, Mar. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 336,832, Feb. 28, 1973, abandoned, which is a continuation of Ser. No. 601,874, Dec. 15, 1966, abandoned. This application Feb. 8, 1977, Ser. No. 766,667

Claims priority, application France, Dec. 17, 1965, 65.42858

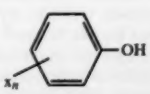
Int. Cl.[2] **C07C** *59/26*

U.S. Cl. 562—471 **10 Claims**

3. A process for the preparation of a 2-phenoxypropionic acid dextrorotatory in acetone, ethanol and chloroform, of the formula:



in which the symbol X_n represents o-methyl, 4-chloro-2-methyl, 2,4,5-trichloro-, or 2,4-dichloro, which comprises heating an alkali metal salt of 2-chloropropionic acid whose sodium salt has an optical rotation $[\alpha]_D^{22} = +4°$ (c = 10, water) with an alkali metal derivative of a phenol of the formula:



in which the symbol x_n is as hereinbefore defined, in a refluxing inert organic solvent of boiling point at least as high as that of an aromatic hydrocarbon solvent, and treating with an acid the resultant alkali metal salt of the said 2-phenoxypropionic acid.

4,173,710

HALOGENATED POLYETHER POLYOLS AND POLYURETHANE FOAMS PRODUCED THEREFROM

Jean-Claude Boulet, Tavaux-Cite, France; Rene Walraevens, Brussels, Belgium; Gerard Bonnety, Tavaux-Cite, France; Jacques Lolivier, and Paul Trouillet, both of Brussels, Belgium, assignors to Solvay & Cie, Brussels, Belgium

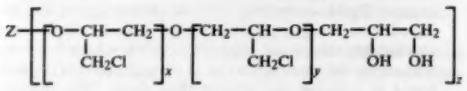
Continuation of Ser. No. 729,423, Oct. 4, 1976, abandoned, which is a division of Ser. No. 607,595, Aug. 25, 1975, abandoned, which is a continuation of Ser. No. 353,536, Apr. 23, 1973, abandoned. This application Nov. 14, 1977, Ser. No. 851,252

Claims priority, application Luxembourg, May 15, 1972, 65359; Feb. 12, 1973, 67005

Int. Cl.[2] **C07C** *43/02, 43/12;* **C08J** *9/00*

U.S. Cl. 568—614 **6 Claims**

1. Polyether polyols of the general formula:



in which z represents a number between 2 and 6, x and y represent numbers between 0 and 12 such that the mean value $\overline{x+y}$ per chain is between 0 and 12, and that z $(\overline{\overline{x+y}})$ in which $\overline{x+y}$ represents the mean value of x+y in the entire molecule is between 1 and 72 and Z represents the residue of a halogenated polyhydroxyl compound initiator and comprises a C_2 to C_6 halogenated aliphatic radical of valence z, the halogen being selected from the group consisting of chlorine and bromine.

4,173,711

3-(2-CHLOROALLYLOXY)-2(10)-PINENE

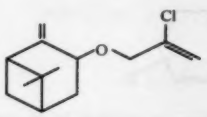
Cynthia J. Mussinan, Bricktown; Braja D. Mookherjee, Holmdel; Manfred H. Vock, Locust; Frederick L. Schmitt, Holmdel, all of N.J.; Edward J. Shuster, Brooklyn, N.Y.; James M. Sanders, Eatontown, N.J.; Bette M. Light, Highlands, N.J., and Edward J. Granda, Englishtown, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 872,937, Jan. 27, 1978, Pat. No. 4,131,687. This application Sep. 5, 1978, Ser. No. 939,895

Int. Cl.[2] **C07C** *43/18*

U.S. Cl. 568—665 **1 Claim**

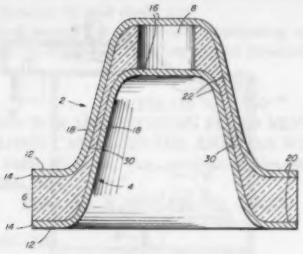
1. The compound having the structure:



4,173,712
ELECTRICAL CIRCUIT COMPONENT PROTECTING DEVICE

Kenneth H. Purser, Manchester, Mass., assignor to General Ionex Corporation, Ipswich, Mass.

Filed Aug. 30, 1978, Ser. No. 937,954
Int. Cl.[2] H05K 9/00
U.S. Cl. 174—35 R **5 Claims**



1. A device for protecting electrical circuit components from the effects of transient electromagnetic fields in the external environment surrounding the device comprising at least two substantially identical conductive members in spaced, stacked relation; each said conductive member comprising a substantially flat, permissibly apertured, inner portion, a substantially flat flange portion adjacent its periphery, and a wall portion inclined outwardly relative to said central portion, said wall portion connected to said flange portion and to said inner portion by first and second gradually sloping arch portions respectively; and a layer of dielectric material filling the spaces between each conductive member and the conductive members adjacent thereto, each said layer being adapted to allow the location of an electrical circuit component in the region between the inner portions of adjacent conductive members; said device thereby defining in the spaces between adjacent conductive members a component protecting region between adjacent inner portions surrounded in turn by a first transitional region between adjacent second arch portions, a high energy storage region between adjacent wall portions, and a second transitional region between adjacent first arch and flange portions, such that the device will remain electrically stable under surge conditions and the energy of a surge will be stored in the high energy storage region leaving the component protecting region substantially unaffected.

4,173,713
CONTINUOUSLY EXPANDABLE SWITCHING NETWORK

Kenneth F. Giesken, Fairfield, and John M. Cotton, East Norwalk, both of Conn., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Continuation of Ser. No. 766,396, Feb. 7, 1977, abandoned. This application May 25, 1978, Ser. No. 909,583
Int. Cl.[2] H04M 3/00
U.S. Cl. 179—18 EA **16 Claims**

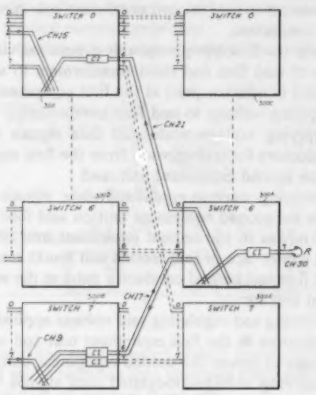
1. A plurality of switches arranged in a plurality of stages of said switches to comprise an expandable switching network with each of said switches comprising:

means for providing a plurality of inlets for receiving digital signals and a plurality of outlets;

means for adapting each of said outlets to selectively reflect said digital signals back to any of said inlets;

means for selectively coupling any of said inlets to any of said outlets to provide an output for said digital signals out of said switch from said outlets;

means for coupling said signals from the outlets of the switches of any of said stages of switches to the inlets of switches of higher order switching stages; and

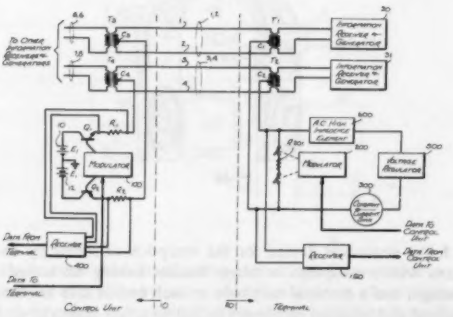


means for reserving said outlets of any of said switches for coupling said digital signals from said outlets to the inlets of switches of said higher order switching stages.

4,173,714
COMMUNICATION CIRCUIT WITH COMBINED POWER FEED AND DATA TRANSMISSION OVER A PHANTOM CHANNEL

Alan Bloch, New York; Frank A. Coviello, Peekskill, both of N.Y.; Ira Guzik, Fairfield, and Candido Puebla, Bridgeport, both of Conn., assignors to TIE/Communications, Inc., Stamford, Conn.

Filed Jun. 3, 1977, Ser. No. 803,243
Int. Cl.[2] H04Q 5/18
U.S. Cl. 179—99 R **12 Claims**



1. A circuit arrangement providing first and second communication channels, power feed and bi-directional signalling between first and second equipment units comprising,

four conductors the ends of which are connected between the first and second equipment units, a first pair of said conductors providing a first information channel between the first and second equipment units, and a second pair of said conductors providing a second information channel between the first and second equipment units,

first and second transformers for inductively coupling associated first communication channels in the first and second equipment units via said first conductor pair, each of the windings of said first and second transformers connected to said first conductor pair having a center tap connection,

third and fourth transformers for inductively coupling associated second communication channels in the first and

second equipment units via said second conductor pair, each of the windings of said third and fourth transformers connected to said second conductor pair having a center tap connection,

means in the first equipment unit connected via said center taps of said first and third transformers to said first and second conductor pairs at the first equipment unit for

(a) applying voltage to said four conductors,

(b) applying voltage-modulated data signals to said four conductors for transmission from the first equipment unit to the second equipment unit, and

(c) receiving current-modulated data signals transmitted from the second equipment unit on said four conductors, and means in the second equipment unit connected via said center taps of said second and fourth transformers to said first and second conductor pairs at the second equipment unit for

(a) receiving and regulating said voltage applied to said four conductors in the first equipment unit and applying said voltage to power the second equipment unit,

(b) receiving voltage-modulated data signals on said four conductors from the first equipment unit, and

(c) applying current-modulated data signals to said four conductors for transmission from the second equipment unit to the first equipment unit.

4,173,715

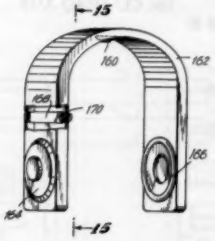
ACOUSTICAL DEVICE

Theodore D. Gosman, 9 Warner Ct., Huntington, N.Y. 11743

Filed Jan. 13, 1978, Ser. No. 869,175

Int. Cl.[2] H04M 1/05; H04R 5/00

U.S. Cl. 179—156 R **22 Claims**



1. An acoustical device for the reception of sound by humans which comprises a stereo headset having an acoustic passage, and a terminal earphone at each end of said headset, each of said terminal earphones including a first means to emit sound into said acoustic passage, said headset being mountable on the head of a human so that the terminal earphone at each end of said headset is disposable over an ear of a human, said acoustic passage being a continuous hollow passage and extending from one side of said headset to the other side, so that sound emanating from one terminal earphone is channeled from one ear of a human to the other ear, and so that sound emanating from the other terminal earphone is channeled from the other ear of a human to the one ear, an adjustable mechanical sound inhibitor disposed in said acoustic passage, so that various ratios of direct sound to ambient sound reflected through said acoustic passage may be mixed and received in an ear of a human as a mixed sound, said mechanical sound inhibitor permitting at least partial channeling of sound between the ears, and a second means to emit sound into said acoustic passage, said second means to emit sound being disposed in said acoustic passage.

4,173,716

MICROWAVE HEATING APPARATUS

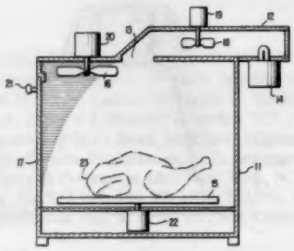
Hirokazu Takahashi, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kanagawa, Japan

Filed Jul. 19, 1977, Ser. No. 817,039

Claims priority, application Japan, Jul. 20, 1976, 51/86353

Int. Cl.[2] H05B 9/06

U.S. Cl. 219—10.55 F **18 Claims**



1. A microwave heating apparatus for heating an object comprising:

an oven enclosure having a microwave coupling inlet;

a magnetron for generating a microwave at the oscillating frequency of the magnetron;

a waveguide having one end connected to the microwave coupling inlet and the other end connected to the magnetron for transmitting a microwave from the magnetron into the oven enclosure;

drivable means disposed inside the oven enclosure for stirring the pattern of the electromagnetic field of the microwave transmitted into the oven enclosure;

drivable means disposed inside the waveguide for frequency pulling the oscillating frequency of the magnetron; and

means for driving the frequency pulling means independently of the stirring means.

4,173,717

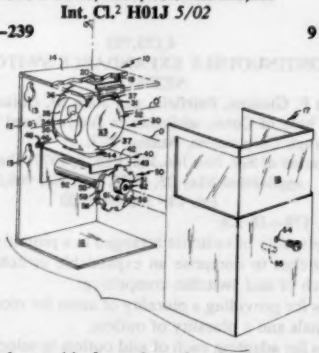
OPTICAL ASSEMBLY

David B. Lederer, Rochester, N.Y., assignor to Detection Systems Inc., Fairport, N.Y.

Filed Jan. 27, 1978, Ser. No. 872,885

Int. Cl.[2] H01J 5/02

U.S. Cl. 250—239 **9 Claims**



1. An optical assembly for a photoelectric beam system, said assembly comprising

(a) a frame;

(b) an optical module including a spherically shaped shell having a radiation focusing element mounted on the surface thereof for focusing incident radiation into the inte-

rior of said shell, said radiation-focusing element having an optical axis;

(c) a pair of spaced support members mounted on said frame for supporting said shell therebetween, at least one of said support members being movable between a first position in which said members cooperate to support said shell in such a manner as to enable said shell to be manually rotatable in at least two mutually perpendicular planes, and a second position in which said members cooperate to prevent rotation of said shell; and

(d) locking means for selectively positioning said movable member in either said first or second position.

4,173,718

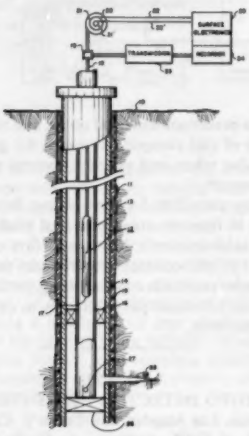
METHOD FOR MONITORING FLUID MOVEMENT BEHIND CASING IN OIL AND GAS WELLS

Walter H. Fertl, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 2, 1977, Ser. No. 830,239

Int. Cl.[2] G01V 5/00

U.S. Cl. 250—259 **3 Claims**



1. A method for locating fluid movement between the casing and the earth formations in a cased earth borehole, comprising:

traversing a cased earth borehole with a gamma ray detection system, thereby creating a base log;

injecting a fluid containing a salt from the group consisting of potassium, thorium and uranium salts into the formation of interest adjacent the casing; and

thereafter traversing the said cased earth borehole with said gamma ray detection system, thereby creating a second log indicative of the movement of said injected fluid.

4,173,719

APPARATUS FOR IRRADIATING FLOWING MATERIALS

Manfred Tauber, Holm; Dieter Heuer, Uetersen; Max Kröncke, Wedel, all of Fed. Rep. of Germany, and Peter Schimmelpfennig, deceased, late of Holm, Fed. Rep. of Germany (by Ella Anneliese Schimmelpfennig, nee Lehmann, sole heir), assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt, Fed. Rep. of Germany

Filed Aug. 29, 1978, Ser. No. 937,856

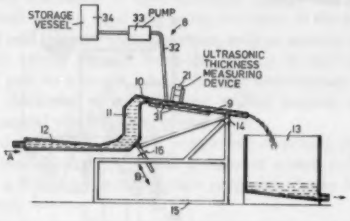
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1977, 2746917

Int. Cl.[2] G01N 23/00

U.S. Cl. 250—310 **13 Claims**

1. In an apparatus for irradiating a flowing material with an electron beam, including an electron beam accelerating device having an electron beam emitter; an irradiation device having an inclined irradiation tray arranged underneath the electron beam emitter and determining a flowpath for the material to be irradiated; and material feeding means for introducing the material onto the inclined irradiation tray; the improvement in said material feeding means comprising

(a) a riser vessel having an upper portion, a bottom portion



and an overflow edge situated at said upper portion and adjoining said irradiation tray upstream thereof as viewed in the direction of material flow; and

(b) at least one diffuser communicating with said bottom portion of said riser vessel for introducing the material thereinto.

4,173,720

METHOD AND APPARATUS FOR IMAGE CONSTRUCTION

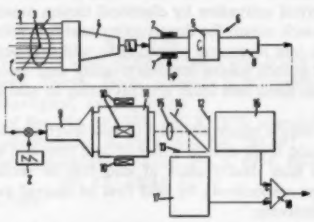
Ronald J. Geluk, Nootdorp, Netherlands, assignor to N.V. Optische Industrie "De Oude Delft", Netherlands

Filed May 9, 1977, Ser. No. 795,238

Claims priority, application Netherlands, May 17, 1976, 7605254

Int. Cl.[2] A61B 6/00, 6/02

U.S. Cl. 250—445 T **33 Claims**



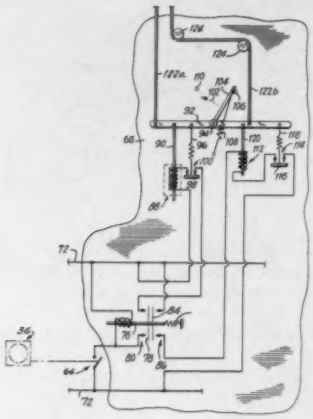
1. A method of constructing at least one tomogram from a plurality of profiles by means of back projection, characterized in that analog convolution with a suitable function is applied and being further characterized in that line images derived from the profiles are reproduced, summed, by means of back projection on a cathode ray tube having a presisting screen; that the residual image is convolved analogly by means of a luminance amplifier provided with deflection coils with a function F(x,y) established in at least one mask disposed behind said luminance amplifier.

9. A method of constructing at least one tomogram from a plurality of profiles by means of back projection, characterized in that analog convolution with a suitable function is applied and being further characterized in that profiles are written on the persisting screen of a cathode ray tube; that the written profiles are convolved analogly by means of a luminance amplifier provided with deflection coils with a function F(x) established in at least one mask disposed behind the luminance amplifier; and that the required tomogram is formed from the convolved profiles by means of back projection.

4,173,721
WINDOW SHADE CONTROLS AND METHOD ASSOCIATED THEREWITH

Emma D. Louis, 157-11 N. Conduit Ave., Jamaica, N.Y. 11434

Filed Mar. 17, 1978, Ser. No. 887,639
Int. Cl.[2] H01H 3/06, 5/06
U.S. Cl. 307—115 1 Claim



1. A device for automatically controlling a window shade comprising:

a lever arm pivotally mounted for movement between a first and second position;

first solenoid means coupled to said lever arm for pivotting said lever arm to said first position in response to electrical activation by electrical timing means;

second solenoid means coupled to said lever arm for pivotting said lever arm to said second position in response to electrical activation by electrical timing means;

first switch means for deactivating said first solenoid means upon said lever arm pivotting to said first position;

second switch means for deactivating said second solenoid means upon said lever arm pivotting to said second position;

spring toggle means coupled to said lever arm for maintaining said lever arm in either of said first and second positions after deactivation of said first or second solenoid means respectively by said first or second switch means respectively;

electrical timing means electrically coupled to said first and second solenoid means to sequentially activate and deactivate the latter according to a predetermined timing sequence; and

a pair of elongated flexible members, each having one end connected to a respective end portion of said lever arm and another end adapted to be connected to one of a pair of strings of a Venetian blind, so that when said lever arm assumes said first position, one of the Venetian blind strings is pulled by one of the elongated flexible members and when said lever arm assumes the second position, the other of said Venetian blind strings are pulled by the other of the elongated flexible members.

4,173,722
DIGITAL PULSE GENERATOR WITH END-STOP DETECTION AND CONTROL

Richard L. Detering, Buffalo, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 14, 1978, Ser. No. 886,390
Int. Cl.[2] H03K 17/72, 5/13
U.S. Cl. 307—252 Q 4 Claims

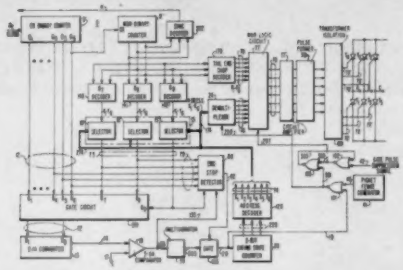
1. In a digital gate pulse generator for sequentially firing thyristors in accordance with a time reference signal derived from a digital counter, the combination of:

comparator means operative in relation to said time reference signal and to a firing angle reference signal to assume one of two states;

means responsive to a transition by said comparator means from a first to a second state for generating a hard pulse;

means responsive to a generated hard pulse for causing firing of the "next" thyristor to be set into conduction;

means responsive to said second state of said comparator means for generating a substitute pulse when said counter



assumes a predetermined first count and responsive to said first state of said comparator means for generating a substitute pulse when said counter assumes a predetermined second output;

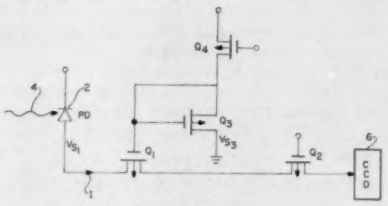
means being provided for preventing firing of said next thyristor in response to a generated hard pulse when the count in said counter is below said first count, and when the count in said counter is above said second count;

said hard pulse responsive means being further responsive to a generated substitute pulse, thereby to cause firing of said "next" thyristor.

4,173,723
PHOTO DETECTOR INPUT CIRCUIT

Gabor C. Temes, Los Angeles, and Derek T. Cheung, Thousand Oaks, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 12, 1978, Ser. No. 868,946
Int. Cl.[2] H03K 1/02
U.S. Cl. 307—304 4 Claims



1. A photo detector input circuit comprising:

a first FET with a source for coupling to an output of a photo detector, a gate coupled to a first gate voltage, and a drain for coupling to an output circuit;

a second FET with a grounded source and a gate coupled to said gate of said first FET, said second FET being positioned adjacent said first FET so that the gate voltages and threshold voltages of said first and second FETs are substantially equal;

a third FET with a source coupled to the drain of said second FET, a gate coupled to a third gate voltage, and a drain coupled to a third drain voltage; and

wherein said gates of said first and second FETs are coupled to said drain of said second FET, and said third gate

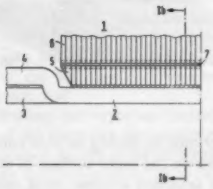
voltage and said third drain voltage are chosen so that the currents of the drains of said second and third FETs are equal and approximately the same as the output current of the photo detector, whereby a low impedance and virtual ground are provided at said source of said first FET, and the voltage variation of said first FET is reduced.

4,173,724

TWO PART LAMINATED STATOR FOR AN ELECTRIC MACHINE WITH AN AIR-GAP WINDING

Rudolf von Musil, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 5, 1977, Ser. No. 857,700
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1976, 2656132
Int. Cl.[2] H02K *1/12*
U.S. Cl. 310—258 2 Claims



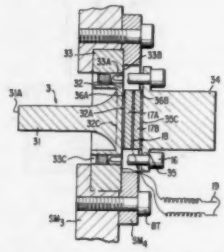
1. In a stator of an electric machine having a stator winding and a laminated core subdivided into radially inner and radially outer concentric component cores defining a cylindrical joint therebetween, axially extending slots formed in said component laminated cores at said cylindrical joint and coupling means fitted in said slots for preventing rotation of said laminated core components, said stator winding being secured at the inner periphery of said inner component core, said stator winding comprising a one-layer air gap winding with every respective second bar thereof being radially outwardly bent in the end turn region thereof, said coupling means comprising elastic isolating members received in oppositely disposed pairs of said axially extending slots.

4,173,725

PIEZOELECTRICALLY DRIVEN ULTRASONIC TRANSDUCER

Kiyokazu Asai, and Akihiro Takeuchi, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Mar. 7, 1978, Ser. No. 884,148
Claims priority, application Japan, Mar. 7, 1977, 52/24969
Int. Cl.[2] H01L *41/10*
U.S. Cl. 310—325 43 Claims



1. An ultrasonic transducer comprising:

a first cylindrical member including a mechanical vibration amplifying part formed in symmetry around the axis thereof and having a gradually increased cross-sectional area toward a base portion thereof, said base portion being formed with an axially thinnest walled annular portion and a flat surface perpendicular to the axis thereof, and an annular rigid part integrally formed with said mechanical vibration amplifying part coaxially therewith, said annular rigid part abutting said thinnest walled portion and being extended from said thinnest walled portion axially and radially outwardly to have sufficient rigidity and weight, and said annular rigid part being provided, in the proximity of said thinnest walled portion, with an annular groove which axially extends from the surface of said annular rigid part to a depth which at least corresponds to the axial thickness of said thinnest walled portion of said mechanical vibration amplifying part;

a second cylindrical member comprising a backing block of a cylindrical body, the base portion of which is formed with a flange and a flat surface perpendicular to the axis thereof;

an ultrasonic transducer portion interposed between said flat surfaces of said first and second cylindrical members and including a pair of piezoelectric elements having flat surfaces perpendicular to the axis of said first and second cylindrical members, and an electrode plate interposed between said pair of piezoelectric elements; and

fastening means for pressingly abutting said flat surfaces of said piezoelectric elements against flat surfaces of said first and second cylindrical members and integrally clamping said annular rigid part and said flange of said second cylindrical member to each other in a manner to circumvent said annular groove and said ultrasonic transducer portion,

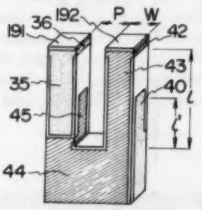
whereby cracking of piezoelectric elements is prevented to ensure stabilized operations without transitional variations in electric impedance and resonance frequency and to allow continuous vibrating operations of large amplitude over a long period of time.

4,173,726

TUNING FORK-TYPE PIEZOELECTRIC VIBRATOR

Motoyasu Hanji, Tokyo, Japan, assignor to Kabushiki Kaisha Kinekisha-Kenkyujo, Tokyo, Japan

Continuation of Ser. No. 592,955, Jul. 3, 1975, abandoned. This application Jul. 8, 1976, Ser. No. 703,497
Claims priority, application Japan, Jul. 5, 1974, 49-78680[U]
Int. Cl.[2] H01L *41/10*
U.S. Cl. 310—366 5 Claims



1. A tuning fork-type piezoelectric vibrator comprising:

(i) a vibrator body having legs each with a sliding end and a free end, both as defined in the foregoing specification

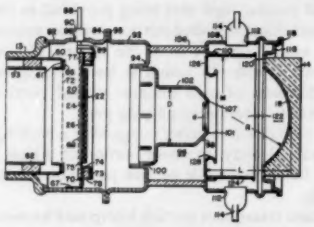
(ii) at least one excitation electrode positioned on a face of each leg, each such excitation electrode commencing at said sliding end and extending from said sliding end for a distance of from 0.3 l to 0.5 l, where l is the length of each of said legs measured from said sliding end to said free end.

4,173,727

ELECTRON IMAGE DEVICE

James Vine, Elmira, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 23, 1966, Ser. No. 560,385
Int. Cl.[2] H01J *39/00*
U.S. Cl. 313—99 5 Claims



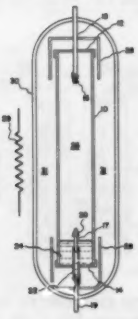
1. An electron-optical system comprising a photocathode element for emitting an electron image in response to a radiation image directed thereon, said photocathode element including an emitting surface of substantially spherical configuration having a radius with a center of curvature on the axis of said electron-optical system, and an anode disposed about the axis of said electron-optical system, said anode having an aperture through which said electron image is directed, said aperture having a diameter of a magnitude not less than 0.3 nor more than 0.5 times the length of said radius, said anode has a conical portion extending away from said aperture at an angle of approximately 45° with respect to the axis of electron-optical system, and a focusing electrode is disposed between said photocathode element and said anode element, said focusing electrode has a cylindrical portion disposed coaxially about the axis of said electron-optical system, said cylindrical portion having a diameter of a magnitude in the approximate range of 2.0 to 2.2 times the length of said radius.

4,173,728

PULSED CESIUM DISCHARGE LIGHT SOURCE

Harald L. Witting, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 730,129, Oct. 6, 1976, abandoned. This application May 19, 1978, Ser. No. 907,792
Int. Cl.[2] H01J *13/00*
U.S. Cl. 313—163 25 Claims



1. A long-lived metal vapor discharge lamp, suitable for operation in a pulsed mode, comprising:

an evacuable arc tube having a first end and a second end;

a solid metal anode disposed in the first end of said arc tube;

a liquid cesium reservoir disposed in the second end of said arc tube;

a cathode comprising a conductive material capable of adsorbing cesium, said cathode pointedly protruding from said reservoir so as to provide a preferred discharge path; and

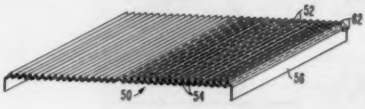
a fill gas, including cesium vapor, disposed within said arc tube between said anode and said cathode at a vapor pressure between approximately 5 torr and approximately 100 torr.

4,173,729

CATHODE-RAY TUBE HAVING A STEPPED SHADOW MASK

Robert P. Stone, and Albert M. Morrell, both of Lancaster, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Jun. 24, 1977, Ser. No. 809,859
Int. Cl.[2] H01J *29/07*
U.S. Cl. 313—403 16 Claims



1. In a cathode-ray tube including an evacuated envelope, a color phosphor screen on the inner surface of said envelope, a multiapertured color selection shadow mask spaced from said screen, and electron gun means for generating and directing a plurality of electron beams along paths through said mask to said screen, the improvement comprising,

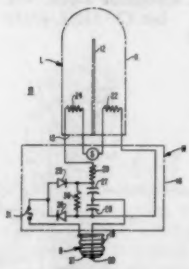
said shadow mask having a plurality of apertured portions through which said electron beams pass and at least one other portion connecting the apertured portions through which said electron beams do not pass, said other portions being step risers aligned substantially parallel to electron beam paths at corresponding points within said tube, and said step risers offsetting adjacent apertured portions relative to said screen.

4,173,730

COMPACT FLUORESCENT LAMP UNIT HAVING INTEGRAL CIRCUIT MEANS FOR DC OPERATION

Robert G. Young, Nutley, and Edward W. Morton, Teaneck, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 11, 1978, Ser. No. 923,598
Int. Cl.[2] H01J *7/44, 17/34*
U.S. Cl. 315—53 15 Claims



1. An electric lamp unit adapted for use in a lighting fixture that includes a lamp socket having terminals which are connected to an alternating-current power source when the fixture is energized, said lamp unit comprising, in combination;

an electric discharge lamp of single-ended construction having an envelope which contains (a) a pair of electrodes

that are located at the same end of the envelope and on opposite sides of a partition means which defines a tortuous discharge channel and (b) an ionizable medium comprising a material which is in a vaporous state during lamp operation and exhibits a cataphoretic effect when the lamp is operated on direct current that causes the vaporous material to migrate toward and accumulate at the cathode end of the discharge channel and thus extinguish the electric discharge under such direct-current operating conditions, the electrode-containing end of said envelope having external contact means that are connected to said electrodes by lead-in conductors and said envelope end also having an hermetically-sealed component through which the lamp is evacuated when it is being manufactured,

a module coupled to said discharge lamp and enclosing circuit means that is connected to said electrodes and is adapted to convert an alternating-current input into a direct-current output which is applied to said electrodes when the circuit means is energized,

a base component coupled to said circuit-module and having terminals that are connected to the input portion of said circuit means and are engageable by the lamp socket terminals of the lighting fixture when the lamp unit is placed therein, and

means for allowing the vaporous ionizable material, during operation of the lamp in a direct-current mode, to circumvent the partition means at the electrode-containing end of the envelope and thus migrate from the cathode end to the anode end of the discharge channel without permitting the electric discharge to bypass the partition means comprising a transversely-extending diaphragm assembly that is in engagement with said partition means and the walls of the envelope and includes a porous component which is permeable to the vaporous ionizable material but constitutes an impenetrable barrier to the electric discharge,

said porous component being so disposed that it also provides a passageway from the hermetically-sealed component of the electrode-containing end of said envelope into the envelope interior which permits water vapor and gaseous impurities to be evacuated from the envelope through said diaphragm assembly during lamp manufacture prior to the closure of said hermetically-sealed component.

4,173,731

RESISTOR COMPOSITION FOR SPARK PLUG HAVING A RESISTOR ENCLOSED THEREIN

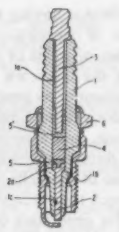
Shunichi Takagi, and Masaru Fukuoka, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Mar. 2, 1978, Ser. No. 883,084

Claims priority, application Japan, Mar. 2, 1977, 52-22305

Int. Cl.[2] H01J *7/44, 17/34, 23/16;* **H01K** *1/62*

U.S. Cl. 315—58 **16 Claims**



9. In a spark plug having a resistor sealed therein and including a center electrode, a terminal electrode, an electrically conductive glass positioned between the center electrode and the terminal electrode, and a resistor separating the electrically conductive glass between the center electrode and the terminal electrode, wherein the center electrode and the terminal electrode are placed in a face-to-face relationship in an electrode bore of a porcelain insulator of the spark plug and sealed therein, the improvement which comprises said resistor being produced from a resistor composition comprising

(1) 100 parts by weight of

(a) a glass; and

(b) an inorganic filler selected from the group consisting of alumina, zircon, zirconia, silica, mullite, a clay or a mixture thereof;

with the glass (a) being present in a proportion of about 30 to about 70% by weight and the inorganic filler (b) being present in a proportion of about 70% to about 30% by weight; and wherein at least about 0.1% by weight of the inorganic filler (b) is replaced by at least one non-oxide compound having covalent bond characteristics and a specific resistivity of at least about 10^5 Ωcm at about 20° C. to about 300° C.;

(2) about 0.5 to about 7 parts by weight of carbon; and

(3) 0 to about 20 parts by weight of at least one of a metal oxide, a transition metal carbide, SiC having a low electrical resistivity and B_4C.

4,173,732

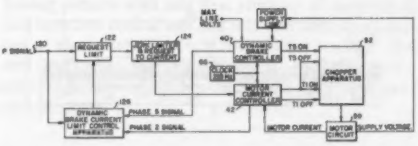
DYNAMIC BRAKE CURRENT LIMITING CONTROL APPARATUS AND METHOD

Larry W. Anderson, West Mifflin, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 9, 1978, Ser. No. 876,310

Int. Cl.[2] H02P *3/12, 3/14*

U.S. Cl. 318—375 **10 Claims**



1. In control apparatus for a chopper having a current conducting thyristor and being responsive to a brake effort request signal for determining the current of a transit vehicle electric motor operating as a generator and thereby the brake effort provided when that current is supplied to a dynamic braking resistor, the combination of

means for determining a first time interval that current from said motor flows in the dynamic braking resistor,

means for determining a second time interval that current from said motor is not flowing in said thyristor,

means for establishing a predetermined relationship between said first time interval and said second time interval, and

means for controlling the current generated by said motor in response to said predetermined relationship.

4,173,733

BATTERY CHARGER WITH LIQUID CRYSTAL CHARGE CURRENT INDICATOR

Raymond K. Sugalski, and Charles R. Blake, both of Gainesville, Fla., assignors to General Electric Company, Gainsville, Fla.

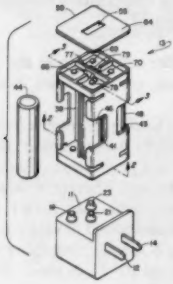
Continuation of Ser. No. 793,012, May 2, 1977, abandoned. This application May 30, 1978, Ser. No. 910,517

Int. Cl.[2] H02J *7/00*

U.S. Cl. 320—48 **9 Claims**

1. A battery charger comprising (a) a charger housing; (b) a circuit means in said housing for connection to a power source and for supplying charge current to a cell connected in said circuit means, said circuit means comprising a heat-generating

circuit element; and (c) a liquid crystal indicator for indicating the flow of current through said element responsive to the



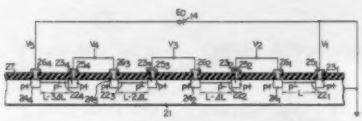
change in temperature of said element, said indicator fixed in said housing in a position adjacent said element.

4,173,734

VOLTAGE DIVIDING INTEGRATED CIRCUIT DEVICE

Masataka Hirasawa, Ayase; Akira Hashimoto, Yokohama; Kenichi Nagao, Yokohama, and Toshiaki Kobayashi, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Jan. 31, 1978, Ser. No. 873,882
Claims priority, application Japan, Jan. 31, 1977, 52-9396
Int. Cl.[2] H01L *27/10;* G05F *3/10*
U.S. Cl. 323—8 **6 Claims**



1. A voltage dividing integrated circuit device for providing equally divided potentials between first and second potential supplying terminals comprising:

a semiconductor substrate of a first conductivity type coupled with a predetermined potential;

a plurality of resistive regions of a second conductivity type formed in said semiconductor substrate which are connected in series between said first and second potential supplying terminals, and at least one equally divided potential taking-out electrode connected between respective resistive regions, wherein the lengths of said resistive regions are made progressively shorter in the increasing order of the potential difference between each respective resistive region and said substrate thereby to ensure substantially equal resistive values of said resistive regions.

4,173,735

CONTACT FAULT DETECTOR

Floyd S. Merchant, Box P25, R.D., Asbury, N.J. 08802

Filed Apr. 19, 1978, Ser. No. 897,785
Int. Cl.[2] G01R *31/02*
U.S. Cl. 324—421 **14 Claims**

1. A contact fault detector comprising:

first and second input leads for connecting in series with one or more contacts to be checked,

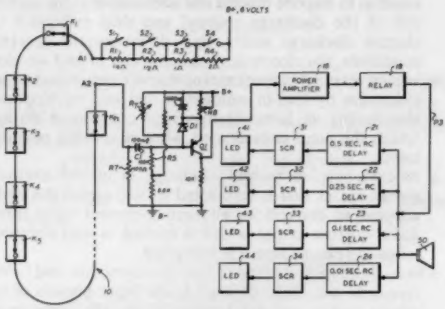
an amplifier having an input and an output,

a capacitor having an input side and an output side, said input side being connected to said first input lead and said output side being connected to said input of said amplifier,

a first resistor connected to said input side of said capacitor to provide a voltage reference,

a second resistor connected to said output side of said capacitor to provide a voltage bleed off function for said capacitor,

said amplifier being responsive to the amplitude of any voltage step applied to said capacitor to provide an output indicative of said amplitude, and



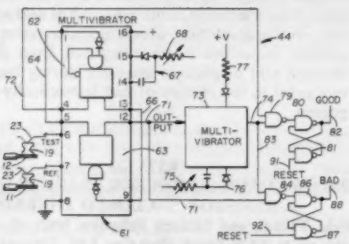
detection and indicating means responsive to said output of said amplifier to provide an indication of said amplitude of the voltage step applied to said capacitor.

4,173,736

CAPACITANCE DETECTING SYSTEM AND METHOD FOR TESTING WIRE CONNECTIONS

Charles K. Adams, St. Louis, Mo., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Mar. 6, 1978, Ser. No. 883,963
Int. Cl.[2] G01R *31/04, 27/26;* H03K *3/284*
U.S. Cl. 324—51 **7 Claims**



1. A system for detecting whether or not an unknown capacitor is above or below a predetermined capacitance level, which comprises:

a free running multivibrator having a pair of cross-coupled networks and a pair of capacitance networks for setting the duration of pulses of trains of output pulses;

means for connecting the unknown capacitance in one of said capacitance networks to produce a first pulse train having pulse durations determined by the value of the unknown capacitance, and a second pulse train having pulses of constant duration which are spaced in accordance with the value of the unknown capacitance;

means responsive to each transition in a first direction in the second pulse train for generating delayed strobing pulses; and

a pair of gating means selectively operated upon occurrences of coincidence of said strobing pulses with either said first or second pulse train for producing output signals indicative of whether or not said unknown capacitance is above or below the predetermined capacitance level.

5. A method of indicating connections between a group of

wires of a cable and terminals secured at both ends of each wire, which comprises:

connecting a terminal which is properly secured to a wire in the cable to one side of capacitance network of one stage of a two stage cross-coupled multivibrator;

connecting a terminal of a test wire having one or both terminals not secured to the test wire to a second side of the capacitance network to produce a first pulse train emanating from said one stage of said multivibrator wherein the pulses are timed at a first frequency in accordance with capacitance between both wires having properly secured terminals connected to the capacitance network, and at a second higher frequency when the terminal of the test wire connected to the capacitance network is not secured to the test wire;

generating a series of timing pulses upon each transition in the same direction of each of said pulses in said first train;

generating a second pulse train emanating from the second stage of said multivibrator which is complementary to said first pulse train;

comparing said timing pulses with both said first and second pulse train;

producing a signal indicative of a non-secured terminal when said timing pulses coincide with the pulses of said first pulse train; and

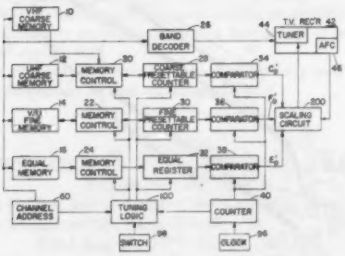
producing a signal indicative of a secured terminal when said timing pulses coincide with the complementary second pulse train.

4,173,737

LIMITED POSITION, NON-VOLATILE MEMORY TUNING SYSTEM

Peter C. Skerlos, Arlington Heights, and Richard A. Smirl, Chicago, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed May 4, 1978, Ser. No. 903,645
Int. Cl.[2] H04B *1/26*
U.S. Cl. 325—418 **10 Claims**



1. A television receiver including:

a voltage controllable tuner;

means producing coarse tuning information for a selected group of channels;

means for producing fine tuning information for said selected group of channels;

means producing equalization information, related to the slope of the tuner voltage-versus-frequency characteristic at said selected channels;

means developing AFC information related to the actual tuning condition of said receiver compared with a reference tuning condition;

means proportioning said fine tuning information and said AFC information with said equalization information;

means combining said proportioned fine tuning information and said proportioned AFC information with said coarse tuning information for the selected channel; and

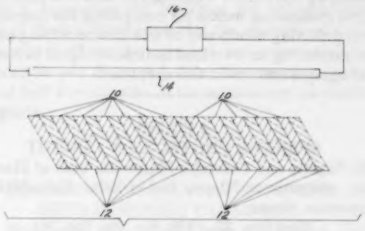
means generating a tuning voltage therefrom for said tuner.

4,173,738

SOLID STATE LASER AMPLIFIER HAVING TWO OUTPUT WAVELENGTHS

Norman L. Boling, Toledo, Ohio, and George Dube, Temperance, Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 469,976, Feb. 18, 1977, abandoned. This application Aug. 16, 1978, Ser. No. 934,242
Int. Cl.[2] H01S *3/16*
U.S. Cl. 330—4.3 **4 Claims**



1. A laser amplifier structure which comprises, in combination:

a first plurality of solid state, plate like lasable elements having a first absorption region of white pump light and an output beam at a first wavelength, said first plurality of elements being aligned in a spaced apart array along a common optical axis;

a second plurality of solid state, plate like lasable elements having a second absorption region of white pump light and an output beam at a second wavelength, said second plurality of elements being aligned in an alternating, adjoining pattern with said first plurality of elements along said common optical axis and said first and second pluralities of elements being such that neither strongly absorbs said first and second output beam wavelengths; and

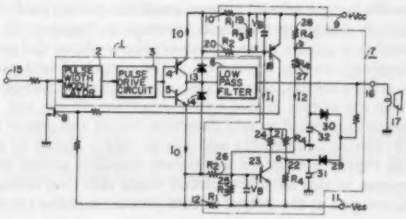
means for furnishing white pump light to said first and second elements.

4,173,739

OVERLOAD DETECTING CIRCUIT FOR A PWM AMPLIFIER

Tadao Yoshida, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 18, 1978, Ser. No. 943,139
Claims priority, application Japan, Sep. 20, 1977, 52-112912
Int. Cl.[2] H03F *3/04*
U.S. Cl. 330—298 **8 Claims**



1. An overload detecting circuit for a PWM amplifier comprising:

(a) a DC voltage source having a pair of terminals;

(b) first and second switching means connected in series between the terminals of said DC voltage source;

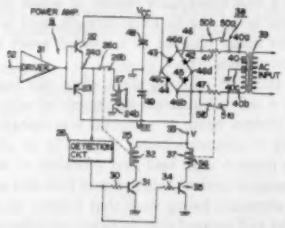
(c) signal input means for ON/OFF controlling said first and second switching means, alternatively, in response to an input pulse signal;

(d) a low pass filter connected between the connection point of said first and second switching means and an output terminal adapted to be connected with a load;
(e) first detecting means for detecting an output current flowing through said first switching means;
(f) second detecting means for detecting an output voltage produced at said output terminal;
(g) first rectifying means connected to said second detecting means and having a discharge time constant circuit determined by the cut-off frequency of said low pass filter; and
(h) first comparing means for comparing the outputs of said first detecting means and of said first rectifying means and for producing an overload indicative signal in response to the comparison result therebetween.

4,173,740
SPEAKER PROTECTION CIRCUIT

Yuuichi Nagata, and Tadataka Matsuoka, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Sep. 22, 1978, Ser. No. 944,781
Claims priority, application Japan, Sep. 29, 1977, 52/131116[U]
Int. Cl.[2] H03F *3/04*
U.S. Cl. 330—298 **5 Claims**

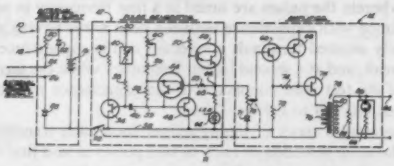


1. An audio amplifier circuit with speaker protection, comprising:
a power amplifier circuit having an output to which a loudspeaker is connected;
a power supply circuit connected with said power amplifier circuit and supplying a DC voltage to said power amplifier circuit;
a detection circuit connected to the output of said power amplifier circuit and detecting an overvoltage exceeding a predetermined level developed at said output;
a relay circuit means connected to said detection circuit and having normally closed contacts connected to the output of said power amplifier circuit to connect said loudspeaker to the output of said power amplifier circuit, said relay circuit means opening said contacts in response to said detection circuit when said overvoltage above the predetermined level is developed at the output of said power amplifier circuit, thereby disconnecting said loudspeaker from the output of said power amplifier circuit; and
a means connected to said detection circuit and power supply circuit and causing said power supply circuit to drop the supply voltage to said power amplifier circuit in response to said detection circuit when said overvoltage is developed at the output of said power amplifier circuit.

4,173,741
PULSE GENERATOR

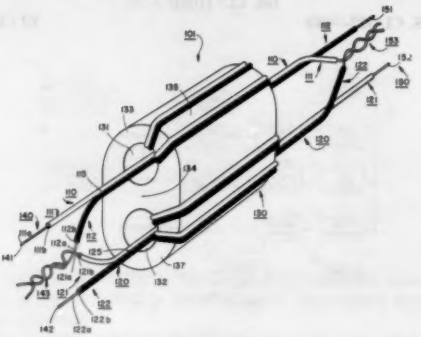
Stanley L. Kameny, 14314 Hatteras St., Van Nuys, Calif. 91401
Division of Ser. No. 583,872, Jun. 5, 1975, Pat. No. 4,062,365.
This application Nov. 18, 1977, Ser. No. 852,623
Int. Cl.[2] H03K *1/18, 3/28*
U.S. Cl. 331—111 **4 Claims**

1. A pulse generator capable of being connected across first and second conductors from a source of power and comprising a unijunction transistor, a pulse generating transistor, a capacitor operatively connected in series with said unijunction transistor and said pulse generating transistor, a first potentiometer means to control the pulse rate and being connected between said unijunction transistor and said capacitor and said first conductor, a second potentiometer means to control pulse width and being connected between said capacitor and said pulse generating transistor and said first conductor, a transistorized switching means, a current limiting resistor operatively connected to said switching means and being connected between said capacitor and pulse generating transistor, said current limiting resistor being operable by said transistorized switching means and being effectively included in circuit with said capacitor and pulse generating transistor means only at selected charge or discharge times of said capacitor, and an impedance changing amplifier connected to said pulse generating transistor and deriving output pulses.



4,173,742
ANTENNA ISOLATION DEVICE

William L. Lehmann, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.
Filed Feb. 15, 1978, Ser. No. 878,131
Int. Cl.[2] H01P *5/12*
U.S. Cl. 333—100 **9 Claims**



1. In a television receiver, apparatus for processing RF signals in both a VHF range and a UHF range received by an antenna network, comprising:
first and second antenna terminals;
signal splitter means for separating RF signals in the VHF range from RF signals in the UHF range, said signal splitter means including first and second input terminals;
a core having a closed loop configuration; and
first and second transmission lines each having first and second conductors, each of said conductors having first and second ends, each of said transmission lines being wound about said closed loop configuration of said core in the same sense and with a predetermined number of turns, said first end of said first conductor of said first transmission line being coupled to said first antenna terminal, said first end of said second conductor of said second transmission line being coupled to said second antenna terminal, said first end of said second conductor of said first trans-

mission line being coupled to said first end of said first conductor of said second transmission line, said second end of said second conductor of said first transmission line being coupled to said first splitter input terminal, said second end of said first conductor of said second transmission line being coupled to said second splitter input terminal, said second end of said first conductor of said first transmission line being coupled to said second end of said second conductor of said second transmission line;

said predetermined number of turns being selected to substantially determine an upper frequency 3 db point higher than the highest frequency in said UHF range;

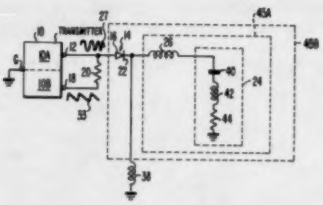
said core being formed from a magnetic material having permeability characteristics which are an inverse function of frequency and selected to substantially determine a lower frequency 3 db point below the lowest frequency in said VHF range without substantially affecting said upper frequency 3 db point.

4,173,743

COUPLING A FREQUENCY MODULATED SIGNAL TO A TUNED LOAD

Arnt P. Arntsen, Manchester, Mass., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 2, 1978, Ser. No. 882,876
Int. Cl.[2] H03N *7/38*
U.S. Cl. 333—32 **7 Claims**



1. A circuit for matching a tuned load to a source that provides a frequency modulated signal, comprising:

means for providing a bias signal having an amplitude that is substantially proportional to the frequency of said modulated signal; and

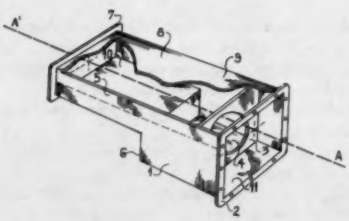
means responsive to said bias signal for tuning said circuit to the frequency of said modulated signal.

4,173,744

IMPEDANCE MATCHED COUPLING DEVICE FOR MICROWAVE TUBES

Georges Faillon, and Guy Egloff, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Aug. 23, 1977, Ser. No. 827,087
Claims priority, application France, Aug. 27, 1976, 76 25955
Int. Cl.[2] H01P *5/02;* H01J *23/32*
U.S. Cl. 333—33 **6 Claims**



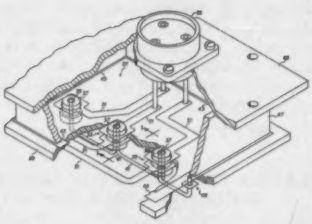
1. A coupling device for a microwave tube made up of two waveguides of rectangular cross-section which are connected together, one of the two waveguides termed the first waveguide and the other termed the second waveguide being coupled in operation at their free ends to a load and to said tube respectively, wherein said first waveguide contains an iris, formed by a metal plate which is pierced by an orifice blocked by a sheet of dielectric material, and said second waveguide has a cross-section whose length is equal and parallel to the length of said first waveguide, the width of the cross-section of the second waveguide being several times smaller than the width of the cross-section of the first waveguide, and the connection between the two waveguides forming a transition, a distance L separating the iris from the transition and the reactance of the iris being such that the impedance at the end of the transition nearer the tube has zero reactance, said iris being placed at said distance L from the transition equal to a multiple of half wavelengths of the microwave transmitted by the first guide.

4,173,745

FILTERING CONFIGURATION USING FEED-THROUGH CAPACITOR

Roger A. Saunders, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 2, 1977, Ser. No. 856,827
Int. Cl.[2] H03H *7/04;* H01G *4/42, 4/38;* H05K *1/04*
U.S. Cl. 333—182 **7 Claims**



1. The combination comprising:

(a) a printed circuit board comprising a dielectric substrate having a plurality of printed wiring leads on a first side of the substrate and a plurality of printed wiring leads on a second side of the substrate, said substrate also having a plurality of holes completely therethrough from said first side to said second side, each of the said plurality of holes having therein a subcombination comprising (i) a dielectric member being received in said hole, (ii) a first electrically conductive means located between said dielectric substrate and said dielectric member for providing a dc short from a printed wiring lead on said first substrate side to a printed wiring lead on said second substrate side, and (iii) a second electrically conductive means inside said dielectric member so as to be insulated from said first electrically conductive means by said dielectric member and so as to capacitively couple with said first electrically conductive means through said dielectric member, and

(b) dc shorting means for electrically interconnecting all said second electrically conductive means.

4,173,746

VAPORIZATION COOLED ELECTRICAL APPARATUS

Thomas W. Stubblefield, South Boston, Va., and Frank W. Benke, Hermitage, Pa., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed May 26, 1978, Ser. No. 909,747
Int. Cl.[2] H01F *27/10*
U.S. Cl. 336—57 **5 Claims**

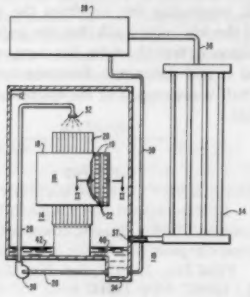
1. Electrical inductive apparatus comprising:

a sealed enclosure;

an electrical winding disposed in said enclosure and producing heat during its operation thereof;

said electrical winding having a plurality of fluid flow passages extending vertically therethrough, with each of said fluid flow passages having a thickness within the range of approximately 0.010 inch to approximately 0.060 inch;

a dielectric fluid, vaporizable within a normal operating temperature range of said electrical winding, disposed in



said enclosure, said dielectric fluid filling said enclosure to a level below the top of said electrical winding, and

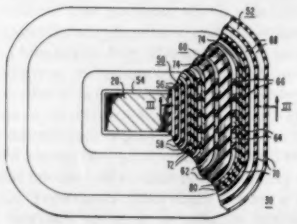
means for supplying said dielectric fluid from the bottom of said enclosure to the top of said fluid flow passages such that said dielectric fluid removes heat from said electrical winding by vaporizing as it contacts the exposed surfaces of said electrical winding in said fluid flow passages as it flows therethrough.

4,173,747

INSULATION STRUCTURES FOR ELECTRICAL INDUCTIVE APPARATUS

Jerry W. Grimes, Danville; Stephen M. Schroeder, and James M. Waters, both of South Boston, all of Va., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 8, 1978, Ser. No. 913,704
Int. Cl.[2] H01F *27/08*
U.S. Cl. 336—60 **7 Claims**



1. Electrical inductive apparatus comprising:

a tank;

dielectric fluid disposed in said tank to cool and electrically insulate said electrical inductive apparatus;

a magnetic core having a plurality of horizontally-spaced, vertically-extending leg portions connecting first and second yoke portions disposed in said tank;

a plurality of electrical winding assemblies disposed in inductive relation with said leg portions of said magnetic core and having a substantially rectangular cross-sectional configuration;

a support structure disposed in registry with said magnetic core and said electrical winding assemblies to provide a solid structure that resists movement of said electrical winding assemblies;

solid insulation means disposed between at least the adjacent portions of said electrical winding assemblies and between adjacent portions of said electrical winding assemblies and said support structure to provide insulation therebetween;

each electrical winding assembly including concentric first and second electrical windings, each formed of a plurality of layers of conductor turns, said first and second electrical windings being subject to radial movement under forces incident to a short circuit; and

insulation structures disposed between certain of said first and second windings in said electrical winding assemblies and between said electrical winding assemblies and said solid insulating means and in movable relation therewith to permit relative movement between said insulation structures and said windings under forces exerted on said windings during a short circuit;

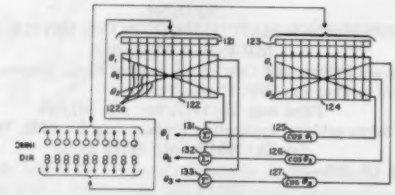
each of said insulation structures including a plurality of spaced, vertically extending spacer members arranged in a first layer and forming a plurality of passages for the flow of said dielectric fluid therethrough, at least one layer of electrical insulating material disposed on each opposing side of said spacer members with each of said layers of electrical insulating material being unbonded to adjacent portions of said windings and said solid insulating means so as to permit relative movement therebetween, and means for securing said spacer members to said layers of electrical insulating material to form a solid structure that maintains said spacer members in a vertical orientation throughout the operation of said electrical inductive apparatus.

4,173,748

ACOUSTIC TRANSDUCING SYSTEM

Leon M. Lewandowski, Merrimack, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Aug. 3, 1978, Ser. No. 930,829
Int. Cl.[2] G01S *3/80*; H04R *1/32*
U.S. Cl. 367—123 **7 Claims**



1. An acoustic transducing system comprising:

an array of spaced apart elements, each of said elements including an omni-directional acoustic transducer and a bi-directional acoustic transducer;

a beam former for the outputs from the omni-directional transducers;

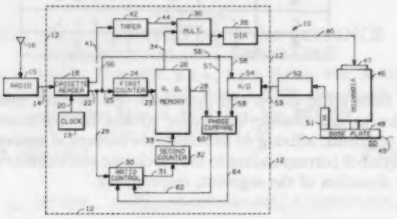
a beam former for the outputs from the bi-directional transducers; and

means for combining selected outputs from said omni-directional beam former and selected outputs from said directional beam former so as to selectively cancel image lobes from the outputs of the bi-directional transducers, whereby the pattern of said array is capable of producing a single main lobe thereby giving the array a uni-directional characteristic over a broad range of steering angles.

4,173,749
DIGITAL DRIVE AND PHASE-LOCK FOR SEISMIC VIBRATORS

David P. Corkhill, Aberdeen, Scotland, assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Mar. 10, 1977, Ser. No. 776,145
Int. Cl.[2] G01V *1/14*
U.S. Cl. 367—190 11 Claims



1. A phase control system for controlling a seismic electro-hydraulic vibrator to operate in synchronism with a reference sweep signal comprising a sinusoidal signal of varying frequency, of selected frequency bandwidth and selected time duration, comprising:

(a) a source of a train of pulses, the time interval between the pulses varying the time in a selected manner;

(b) memory means for storing a plurality of digital words, each in known serial address location, said words representative of the digitized values of one cycle of a sine wave;

(c) first counter means responsive to the pulse train of said source for successively addressing said memory locations; whereby a first output of said memory means comprises a digital sinusoidal reference sweep signal of varying frequency;

(d) second counter means responsive to the pulse train of said source modified by a frequency ratio control means, the output of said second counter means addressing said memory locations; whereby a second output of said memory comprises a digitized sinusoidal drive sweep signal of varying frequency and of different phase with respect to said reference sweep signal;

(e) digital-to-analog converter means receiving said drive sweep signal, the output of said converter means connected to said vibrator;

(f) sensor means responsive to the vibration of the baseplate of said vibrator, the output of said sensor means connected to an analog-to-digital converter means to provide a digital sensor signal; and

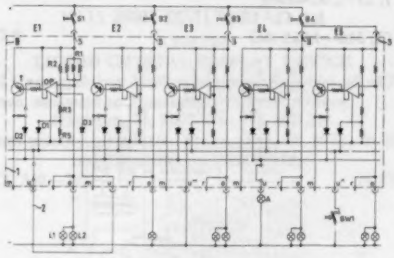
(g) means to compare the phase of said digital sensor signal and said reference sweep signal, and means responsive to said phase comparison to alter the ratio of said frequency ratio control means.

4,173,750
INCANDESCENT LAMP MONITORING DEVICE

Jutta Riba, Rosenbergstr. 26, 5455 Hardert, Fed. Rep. of Germany

Filed Dec. 27, 1977, Ser. No. 864,522
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1976, 2659658
Int. Cl.[2] B60Q *1/00*; G08B *21/00*
U.S. Cl. 340—80 18 Claims

1. In a device for monitoring lamps, in particular lamps of motor vehicles, comprising a measuring resistor connected in series with a lamp to be monitored and means for monitoring the potential drop at the measuring resistor, said monitoring means comprising an operational amplifier and said monitoring device comprising indicator means controlled by said operational amplifier for providing an indication in case of absence of or excessively low potential drop at said resistor, the improvement wherein said operational amplifier comprises a first input and a second input, said first input connected with the junction between said measuring resistor and said lamp to be monitored, and wherein said monitoring means comprises a voltage divider including a first ohmic resistor connected in series with a second ohmic resistor, said series connection of

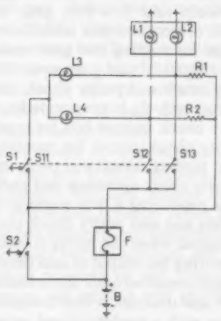


said first ohmic resistor and said second ohmic resistor being connected in parallel with the serial connection of said measuring resistor and said lamp to be monitored, and said second input of said operational amplifier being connected with the junction between said first ohmic resistor and said second ohmic resistor.

4,173,751
STOP LAMP MONITOR CIRCUIT

Stanley Bryant, Taree, Australia, assignor to Bryant Manufacturing Pty. Limited, Taree, Australia

Filed Mar. 14, 1978, Ser. No. 886,398
Int. Cl.[2] B60Q *1/26*
U.S. Cl. 340—80 11 Claims

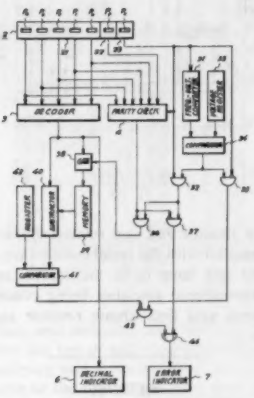


1. A stop signal monitor circuit for use in conjunction with a vehicle stop lamp system wherein a pair of stop lamps is connected across the vehicle's electricity supply through a fuse and a respective pair of switch contacts closable in response to the application of the vehicle's brake, said system including a pair of pilot lamps connected at one side each to a respective one of said pair of stop lamps and connected together at the other side alternatively to the earthed or unearthed side of the vehicle's electricity supply through a series interconnection of first and second switch means, said system further including a pair of resistors connected at one side each to a respective one of said points of connection of said pilot lamps and said stop lamps and connected together at the other side to the point of interconnection of said first and second switch means, said first switch means being operative in response to the application of the vehicle's brake and said second switch means being operative in response to the vehicle's ignition system to provide for an indication by said pair of pilot lamps of an open circuit condition occurring in either of said stop lamps or said fuse.

4,173,752
GRAY CODE READER

Masami Yamanaka, Miki, Japan, assignor to Yamato Scale Company, Limited, Hyogo, Japan

Filed Mar. 24, 1978, Ser. No. 889,910
Claims priority, application Japan, Jun. 7, 1977, 52-67667; Jun. 7, 1977, 52-67668
Int. Cl.[2] G06F *11/10*; H03K *13/34*
U.S. Cl. 340—146.1 AG 8 Claims



1. A gray code reader, comprising a code plate having gray code bits, parity bits and parity check control bits arranged side by side, said parity check control bits consisting of first bits representing one binary level and lying respectively across the boundaries of the adjoining gray code bits and second bits representing the other binary level and occupying the remaining portions between said first bits, gray code bit reading means arranged in correspondence with the respective bits of said gray code bits for reading said gray code bits, a decoder for decoding the output of said gray code bit reading means, parity bit reading means and parity check control bit reading means arranged respectively in correspondence with said parity bits and parity check control bits for reading said bits respectively, a parity check circuit for receiving the output of said gray code bit reading means and parity bit reading means and executing parity check operation said parity check control bit reading means producing a first warning signal upon sensing of said first bits and said parity check circuit producing a second warning signal when the parity is incorrect, a memory for temporarily storing the output of said decoder, a subtractor for producing a difference between the content of said memory and the output of said decoder, a first comparator for comparing said difference with a predetermined value and producing a third warning signal when the difference is greater than the other, memory control means for interrupting the input of said memory in response to at least one of said first and second warning signals, first error indicating means for producing an error signal in response to said second warning signal only in the absence of said first warning signal, and second error indicating means for producing an error signal in response to at least both of said first and third warning signal.

4,173,753
INPUT SYSTEM FOR SINO-COMPUTER

Hsu Ching Chou, No. 24, Chung Hua 2nd Rd., Kaohsiung, Taiwan

Filed Sep. 22, 1977, Ser. No. 835,739
Int. Cl.[2] G06K *9/00*
U.S. Cl. 340—146.3 R 4 Claims

1. A method of entering Chinese characters into an input system of a Sino-Computer, comprising: dividing each Chinese character into six basic strokes, said strokes including horizontal, vertical, dot, dash strokes and clockwise strokes and counterclockwise strokes, assigning each of said strokes a numerical equivalent, and entering said numerical equivalent into said input system in an order determined by the sequence in which said strokes appear in the respective character, said order being

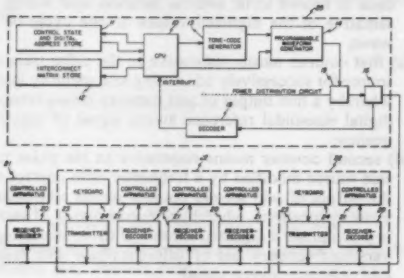
Characters	Strokes in sequence	Spelling numbers
上	| — —	2 1 1
天	— — / ㇏	1 1 4 4
太	丶 丶 / ㇏	3 3 4 4
亡	/ | ——	4 3 1 1
本	乙 乙 丶	6 6 3

first from up to down and then from left to right, and with clockwise and counter-clockwise strokes having more than two segments, affixing to its respective numerical equivalent a sub-symbol corresponding to the clockwise and counter-clockwise direction of the segment, respectively.

4,173,754
DISTRIBUTED CONTROL SYSTEM

George E. Felker, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 778,719, Mar. 17, 1977, abandoned. This application Jun. 24, 1977, Ser. No. 809,939
Int. Cl.[2] H04M *11/00*
U.S. Cl. 340—310 R 9 Claims



1. A system for performing, from a central location, a selected one of a plurality of electrical functions at a selected one of a plurality of remote locations, comprising:

a central processing unit at said central location;

means at said central location for storing a plurality of digital address and functions codes, and electrical function control state information;

encoding means responsive to the control information from said storing means upon enablement by said central processing unit for generating a programmable combination of frequency and digital address and function codes received from said storing means;

means for directly coupling each of said remote locations to said encoding means;

at least one receiver-decoder means at each of said remote locations, each of the respective receiver-decoder means within each remote location having a common address code unique to said remote location;

means responsive to each of said receiver-decoder means, respectively, for performing said selected one of the plurality of electrical functions at said selected one of the plurality of remote locations; and

transmitting means at at least one predetermined one and less than all of said remote locations for transmitting, independent of transmission from said encoding means to said receiver-decoder means, tone-encoded signals back to said central processing unit for obtaining a pre-programmed combination of electrical function control states from said

storing means and causing said encoding means to generate a digital address and function code and a frequency for coupling to said receiver-decoder means by said coupling means for modifying the conditions of those predetermined ones of said means responsive to each of said receiver-decoder means selected from said storing means responsive to the signals transmitted back to said central processing unit from said at least one remote location.

4,173,755

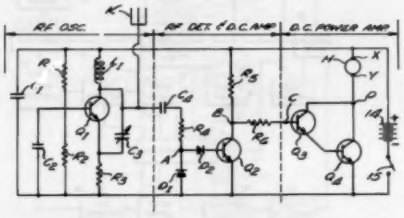
BATTERY-OPERATED BODY CAPACITANCE INTRUSION ALARM APPARATUS

George N. Butler, 4720 NW. 5 La., Boca Raton, Fla. 33431

Continuation of Ser. No. 792,887, May 2, 1977, abandoned. This application Mar. 6, 1978, Ser. No. 883,390

Int. Cl.[2] G08B *13/26*

U.S. Cl. 340—562 8 Claims



1. In a battery-operated intrusion alarm apparatus having:

a battery;

an oscillator energized by said battery to normally produce oscillations;

a sensor operatively coupled to said oscillator to stop said oscillations in response to the body capacitance of a person touching or in close proximity to the sensor; and

means operatively coupled to said oscillator for signalling an alarm when it stops oscillating;

the improvement which comprises means for causing said oscillator to oscillate at a predetermined frequency within the range from substantially 17 MegaHertz to 65 MegaHertz.

4,173,756

ABNORMAL VOLTAGE DETECTION CIRCUIT

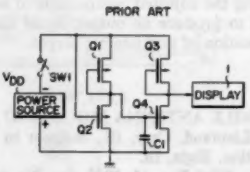
Kenji Kawagai; Shigeki Yoshida, both of Kawasaki; Hisaharu Ogawa, Yokohama, and Toshiro Ohashi, Kawasaki, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Dec. 7, 1977, Ser. No. 858,209

Claims priority, application Japan, Dec. 11, 1976, 51-148309

Int. Cl.[2] G08B *21/00*

U.S. Cl. 340—636 15 Claims



1. An abnormal voltage detection circuit comprising first and second power source terminals; a integration circuit coupled between said first and second power source terminals; an inversion circuit having an input terminal connected to the output terminal of said integration circuit; and means for detecting a voltage interrupt at said source terminals comprising flip-flop means, connected to receive at a first input terminal thereof an output signal from said inversion circuit, for being set into a first condition indicating abnormal voltage upon resumption of interrupted voltage to said source terminals in response to a predetermined absolute voltage lower than the absolute threshold voltage of said inversion circuit and for remaining set even after said threshold voltage of said inversion circuit is surpassed.

4,173,757

LIQUID CRYSTAL DISPLAY DEVICE

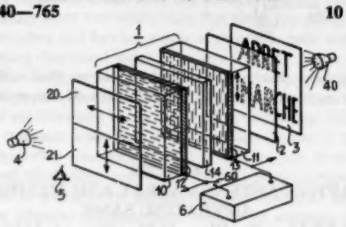
Michel Hareng; Robert Hehlen, and Serge Le Berre, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Sep. 21, 1977, Ser. No. 835,214

Claims priority, application France, Sep. 24, 1976, 76 28768

Int. Cl.[2] G09F *9/32;* G02F *1/13*

U.S. Cl. 340—765 10 Claims



1. A device for alternately displaying one first and at least one second information respectively in the absence and in the presence of a control voltage; said device comprising:

a liquid crystal cell including a layer of a nematic material, one first uniform electrode and at least one second electrode; said first and said second electrode being respectively arranged on one side and the other of said layer for receiving said control voltage and said second electrode facing at least part of said first electrode;

permanent transcription means arranged on at least part of a first outer face of said cell for transcribing at least said first information by a permanent variation in the optical properties of said means; said second electrode covering at least the transcription of said first information in said permanent transcription means;

and commutation means for applying said control voltage between said first and at least one said second electrode;

said first information and said second information being respectively visible and invisible when said control voltage is not applied between said electrodes and the application of said control voltage between said electrodes modifying an optical property of said film for occulting said first information and causing said second information to appear.

4,173,758

DRIVING CIRCUIT FOR ELECTROCHROMIC DISPLAY DEVICES

Mitsuo Sekine, Tokorozawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Aug. 5, 1977, Ser. No. 822,355

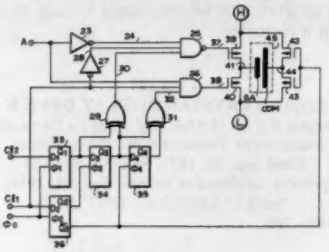
Claims priority, application Japan, Aug. 17, 1976, 51-97474

Int. Cl.[2] G06F *3/14*

U.S. Cl. 340—785 8 Claims

1. A driving circuit for an electrochromic display device provided with a common segment electrode and a display segment electrode, said driving circuit comprising means for applying a common segment signal to said common segment electrode, and means for applying a driving signal to said display segment electrode in accordance with a display decoder output and said common segment signal, said driving signal being at a different level from the level of said common segment signal, thereby effecting display and interruption of the display by using a single source, the improvement compris-

ing means for preventing short-circuiting of the electrodes caused by a delay time between said common segment signal and said driving signal, said means including a delay means for



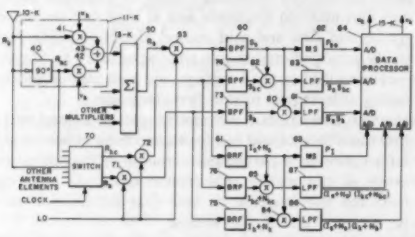
delaying said common segment signal so that said driving signal is enclosed within a time pulse of said common segment signal.

4,173,759

ADAPTIVE ANTENNA ARRAY AND METHOD OF OPERATING SAME

Keshoolal Bakhru, San Diego, Calif., assignor to Cubic Corporation, San Diego, Calif.

Filed Nov. 6, 1978, Ser. No. 957,733
Int. Cl.[2] H04B 7/00
U.S. Cl. 343—100 LE **13 Claims**



1. A method of maximizing the ratio of information signal power to interference plus noise power in an array of N antenna elements including the steps of:

generating at each of said antenna elements composite electrical signals $R_K = S_{KA} + I_{KA} + N_{KA}$ where $1 \leqq K \leqq N$, S_{KA} is a modulated information signal in a first frequency band, I_{KA} is at least one interference signal in said first frequency band, and N_{KA} is noise produced in said antenna elements;

multiplying each of said signals R_K by respective complex weights $u_k + jv_k$ to form product terms;

summing all of said product terms to thereby form a signal R_S;

demodulating said R_S signal;

bandpass filtering said demodulated R_S signal to obtain a signal S_S of a second bandwidth that is substantially less than said first bandwidth and which is representative of the sum of the demodulated S_{KA} signals;

bandreject filtering said demodulated R_S signal to obtain a signal $I_S + N_S$ lying outside of said second bandwidth which is representative of the sum of said interference signals I_{KA} and said noise N_{KA};

determining terms P_{sr} and P_I which respectively indicate the power in said signals S_S and $I_S + N_S$ and;

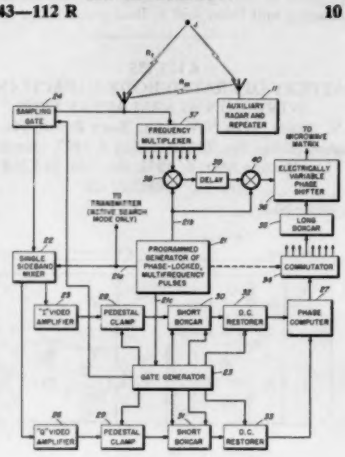
modifying said complex weights $u_k + jv_k$ such that the time rate of change u_k is proportional to the rate of change of T_e with respect to u_k, and such that the time rate of change of v_k is proportional to the rate of change T_e with respect to v_k, where T_e is representative of the ratio of P_{sr} to P_I.

4,173,760

PASSIVE ACQUISITION SYSTEM

John B. Garrison, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 24, 1966, Ser. No. 522,789
Int. Cl.[2] G01S 5/04
U.S. Cl. 343—112 R **10 Claims**



1. The method of effecting acquisition of a broadband jammer target comprising the steps of:

generating reference pulses of predetermined different frequencies,

sampling the jammer signal received at a first location directly from said jammer over a direct path of a known direction relative to said first location,

determining the phase relationship existing between each of said generated reference pulses and the component of said direct jammer signal having the same frequency,

relaying the jammer signal received at a second location, spaced a known distance from said first location, to said first location, adjusting each component of said relayed jammer signal having a frequency corresponding to the frequency of each of said generated reference pulses in accordance with the phase relationship found to exist between that frequency component as received in said direct jammer signal and said generated reference pulse of the same frequency such that the only phase difference then present between said relayed jammer signal components is due to the differential distance existing between the direct and relayed path lengths from said jammer target to said first location, and subsequently

combining the adjusted components of said relayed jammer signal to produce an output signal distinctly identifying the location of said jammer target.

4,173,761

MOBILE ANTENNA MOUNTING ASSEMBLY

James P. Liautaud, Cary, Ill., assignor to American Antenna Corporation, Elgin, Ill.

Filed Dec. 13, 1977, Ser. No. 860,237
Int. Cl.[2] H01Q 1/42
U.S. Cl. 343—715 **19 Claims**

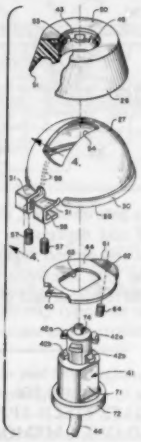
1. A mounting assembly for affixing a mobile antenna to an exterior mounting surface comprising, in combination:

a semi-hemispherical mounting shell including retaining means for fixedly attaching the shell to the mounting surface, and having an elongated aperture extending therethrough;

a skirt member movably positioned on the spherical outer

surface of said shell, said skirt being fixedly attachable to said antenna;

a mounting pin extending through said aperture and said skirt, said pin having connecting means at the end beyond said aperture for engaging said antenna, and further including projecting means for connecting said skirt to said pin,



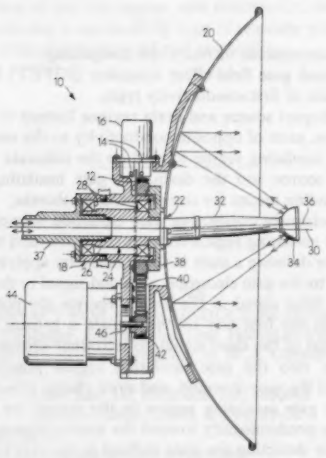
locking means at the other end of said pin for drawing said pin away from the inside surface of said shell whereby said skirt member is drawn against the outside surface of said shell to maintain the antenna in a desired angular position with respect to said mounting surface.

4,173,762

REFERENCE SIGNAL GENERATING APPARATUS

Vernal W. Thompson, Bountiful, and Wilbert C. Anderson, Salt Lake City, both of Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jun. 12, 1978, Ser. No. 914,466
Int. Cl.[2] H01Q *3/10, 3/12;* G01S *5/02*
U.S. Cl. 343—759 **10 Claims**



1. In combination with a mechanism, such as a radar tracking antenna, having a frame, a member, such as a nutator device, mounted on said frame for rotation relative to said frame about a longitudinal axis and means for rotating said member, said member including an element thereon, such as a feed horn, which revolves about said axis as said member is rotated about said axis, an apparatus for generating a pair of reference signals being ninety degrees out of phase with one another and in a desired phase relationship to the angular position of said element during rotation of said member, said apparatus comprising:

reference means attached on said member for rotation therewith about said axis, said reference means including first, second and third edge portions being disposed relative to one another for movement in a generally common rotational path upon rotation of said member, said second edge portion extending outwardly from and ninety degrees about the periphery of said member and having a pair of opposite ends, said third edge portion extending outwardly from and ninety degrees about the periphery of said member and having a pair of opposite ends with each end being displaced ninety degrees from a corresponding one of said opposite ends of said second edge portion, said first edge portion extending outwardly from the periphery of said member and being disposed between, but displaced at its opposite ends at known angular distances from, a corresponding one pair of said opposite ends of said second and third edge portions, said first edge portion being located at a reference position on said member having a known angular displacement from said element of said member such that said second and third edge portions are thereby disposed in a known phase relationship to the angular position of said element during rotation of said member;

transducer means mounted on said frame adjacent the rotational path of said edge portions of said reference means for sensing both the presence and absence of any one of said edge portions in predetermined close proximity to said transducer means during movement of said edge portions in said path upon rotation of said member, said transducer means being operable to generate an electrical signal in response to sensing the presence of any one of said edge portions in said predetermined close proximity to said transducer means and in response to sensing the absence of any one of said edge portions in said predetermined close proximity to said transducer means; and

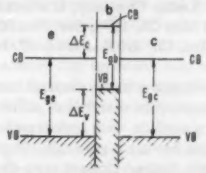
electrical circuitry coupled to said transducer means and receiving said electrical signal generated by said transducer means, said electrical circuitry being operable to generate from said electrical signal a pair of reference signals being ninety degrees out of phase with one another and a sync signal for causing said reference signals to be generated in the desired phase relationship to the angular position of said element during rotation of said member.

4,173,763

HETEROJUNCTION TUNNELING BASE TRANSISTOR

Leroy L. Chang, Mohegan Lake, and Leo Esaki, Chappaqua, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 9, 1977, Ser. No. 805,055
Int. Cl.[2] H01L *29/267, 29/88*
U.S. Cl. 357—12 **44 Claims**



1. A semiconductor device, comprising:

first, second, and third semiconductor regions, said second

region being in contact with and between said first and third regions and having a different composition and conductivity type than said first and third regions,

biasing means for biasing semiconductor junctions formed between adjacent opposite conductivity type semiconductor regions in said device,

said first and third regions having energy band gaps which are shifted due to the different composition in the same direction with respect to the energy band gap of said second region and overlap therewith to produce potential wells which substantially prevent majority carriers in said second region from going to said first and third regions, there being a band edge discontinuity between said first and second semiconductor regions which substantially prevents injection of charge carriers from said first region into said second region,

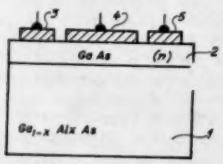
where said second region is sufficiently thin that the dominant mechanism for charge carrier transfer from said first semiconductor region to said third semiconductor region is tunneling through said second region.

4,173,764

FIELD EFFECT TRANSISTOR ON A SUPPORT HAVING A WIDE FORBIDDEN BAND

Baudouin de Cremoux, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Apr. 4, 1978, Ser. No. 893,534
Claims priority, application France, Apr. 8, 1977, 77 10754
Int. Cl.[2] H01L *29/80*
U.S. Cl. 357—22 **9 Claims**



1. A field effect transistor comprising:

a substrate layer;

an active semiconducting layer deposited on said substrate layer, and

three electrodes disposed on the surface of said active layer respectively forming source, gate and drain electrodes, the gate electrode forming a rectifying junction with said active layer, and said active layer forming a heterojunction with said substrate layer, said substrate layer being made of a semiconductor material having a higher forbidden energy band gap than that of said active layer.

4,173,765

V-MOS IMAGING ARRAY

David L. Heald, Hermosa Beach, Calif.; Teh-Hsuang Lee, Webster, and Rajinder P. Khosla, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

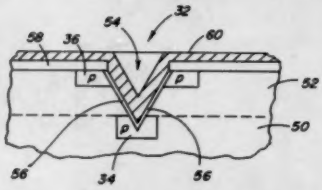
Filed May 26, 1978, Ser. No. 909,907
Int. Cl.[2] H01L *29/78, 27/14*
U.S. Cl. 357—23 **24 Claims**

4. A solid state image sensing element, comprising:

a bulk of semiconductor material of a first dopant type, said bulk having a surface with a depression formed therein, said depression having a generally sloping side;

a first region of a second dopant type disposed within said bulk adjacent said depression, said first region being adapted to be exposed to light, the junction between said first region and said bulk forming a photodiode, whereby when said first region is exposed to light, a charge proportional to the quantity of light may be generated and stored on the junction capacitance of said photodiode;

a second region of said second dopant type disposed within said bulk adjacent said depression and spaced from said first region; and



a gate, including a gate electrode, disposed on said generally sloping side of said depression, said gate extending between said first and second regions,

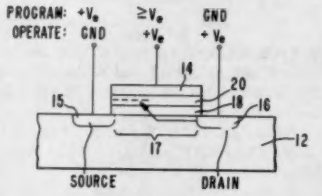
whereby, when said gate electrode is electrically activated, said charge is transferred from said photodiode to said second region.

4,173,766

INSULATED GATE FIELD-EFFECT TRANSISTOR READ-ONLY MEMORY CELL

James A. Hayes, Mountain View, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Sep. 16, 1977, Ser. No. 834,017
Int. Cl.[2] H01L *29/76*
U.S. Cl. 357—23 **7 Claims**



1. A semiconductor memory cell comprising:

an insulated gate field-effect transistor (IGFET) having a substrate of first conductivity type;

spaced-apart source and drain regions formed in the substrate, each of opposite conductivity to the substrate;

a gate insulating region formed on the substrate between the source and the drain, the gate insulating region including means for trapping charge therein;

an electrically conductive gate electrode formed on the gate insulating region between the source and the drain;

means for defining a state in the IGFET by applying a first signal to the gate electrode, a second signal to the source, and a third signal to the drain, wherein the potential of each of the first and second signals is greater than the potential of the third signal, to introduce charge nonuniformly into the gate insulating region predominantly toward the source region, and store charge nonuniformly in the gate insulating region in the means for trapping charge predominantly toward the source region; and

means for detecting the state defined in the IGFET by applying a fourth signal to the gate electrode, a fifth signal to the source, and a sixth signal to the drain, wherein the potential of each of the fourth and sixth signals is greater than the potential of the fifth signal.

4,173,767

CMOS MONOLITHIC INTEGRATED CIRCUIT

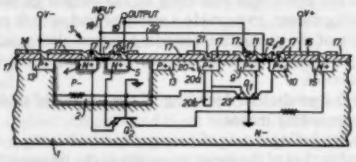
Alastair K. Stevenson, Glenrothes, Scotland, assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 5, 1978, Ser. No. 903,360

Claims priority, application United Kingdom, Jun. 1, 1977, 23248/77

Int. Cl.[2] H01L 27/02

U.S. Cl. 357—44 13 Claims



1. A complementary Metal Oxide Semi Conductor (MOS) transistor device formed on a monolithic substrate having a first region of a first conductivity type and an adjacent second region of a second conductivity type, one of said regions comprising a well in said substrate and surrounded by the other of said regions, comprising:

a first MOS transistor in said first region, said first transistor comprising a first source and drain of said second conductivity type;

a second MOS transistor in said second region, said second transistor comprising a second source and drain of said first conductivity type;

a first parasitic bipolar transistor having a base, an emitter and a collector, each respectively comprising said first region, at least one of said first source and drain, and said second region;

a second parasitic bipolar transistor having a base, an emitter and a collector, each respectively comprising said second region, at least one of said second source and drain, and said first region; and

collector means reducing parasitic current gain between said first and second parasitic transistors, said collector means having an additional collector diffusion disposed in one of said first and second regions, said additional collector diffusion separated from the other of said regions by a portion of said one region, said additional collector diffusion having a conductivity type of opposite polarity from the conductivity type of said one region.

4,173,768

CONTACT FOR SEMICONDUCTOR DEVICES

Edgar J. Denlinger, East Windsor, and Harold S. Veloric, Morristown, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 16, 1978, Ser. No. 869,642

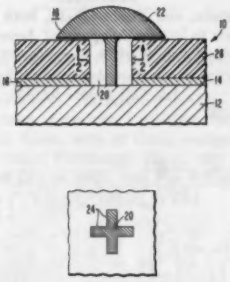
Int. Cl.[2] H01L 23/48, 29/44, 29/52

U.S. Cl. 357—68 8 Claims

1. A semiconductor device comprising

a body of semiconductor material having a surface,

a metal contact on said surface, said contact including a post projecting from the surface of the semiconductor body and a head on the post, said post having a transverse cross-sectional shape of at least three arms projecting radially from a common center point and the head having



a surface area greater than the transverse cross-sectional area of the post.

4,173,769

CIRCUIT ARRANGEMENT A PORTION OF WHICH IS INCLUDED WITHIN IN A MONOLITHIC INTEGRATED SEMICONDUCTOR BODY

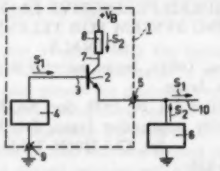
Jan van Straaten, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 12, 1978, Ser. No. 868,977

Claims priority, application Netherlands, Jan. 27, 1977, 7700809

Int. Cl.[2] H04N 9/46

U.S. Cl. 358—20 15 Claims



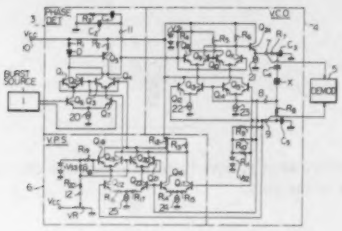
1. A circuit arrangement comprising a first portion included within a monolithic integrated semiconductor body, a second portion disposed outside said body, and means for deriving from said body a signal present within said first circuit portion through a connecting terminal of said body and for supplying another signal from said second circuit portion to said body through the same connecting terminal, said means comprising an amplifier disposed in one of said portions having first, second, and third terminals, said first terminal comprising an input terminal means for receiving one of the signals, said second terminal comprising an input terminal means for receiving the second signal and also an output terminal means for providing the first signal, said second terminal being connected to said connecting terminal of the semiconductor body, said third terminal comprising an output terminal means for providing the second signal.

4,173,770

MANUAL TINT CONTROL CIRCUIT IN THE COLOR APFC LOOP MIXES TWO SUBCARRIER OSCILLATOR SIGNALS

Yasuaki Watanabe, and Yukio Okabe, both of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Jun. 7, 1978, Ser. No. 913,331
Claims priority, application Japan, Jun. 9, 1977, 52-68191
Int. Cl.[2] H04N *9/535*
U.S. Cl. 358—28 **5 Claims**



1. A tint control circuit for a color television receiver comprising:

a phase detector including a switching gate responsive to a control signal to pass a received color burst signal to a load circuit and a filter connected to the load circuit for deriving a DC phase detector output signal;

a voltage-controlled oscillator for generating a color subcarrier signal of which the frequency and phase are variable in dependence on said DC phase detector output signal, said oscillator including means for shifting the phase of said subcarrier to provide a pair of subcarrier signals with a phase difference other than an integral multiple of 180° therebetween; and

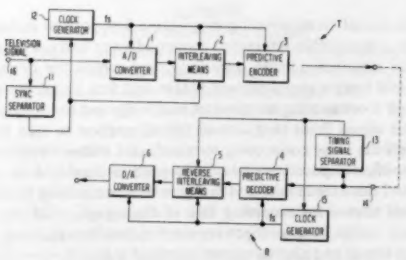
a variable phase shifter for mixing said subcarrier signals in a variable ratio in dependence on a manual setting value of a variable resistor to generate a variable phase-shifted subcarrier signal, the last-mentioned signal being said control signal of said phase detector.

4,173,771

HIGH SPEED PREDICTIVE ENCODING AND DECODING SYSTEM FOR TELEVISION VIDEO SIGNALS

Yukihiko Iijima, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1978, Ser. No. 926,349
Claims priority, application Japan, Jul. 20, 1977, 52/87773
Int. Cl.[2] H04N *7/12*
U.S. Cl. 358—135 **3 Claims**



1. A predictive encoding/decoding transmission system having a transmitting unit and a receiving unit coupled by a transmission link for transmitting a video signal produced through a repeated horizontal and vertical scanning of an optical image, wherein said transmitting unit comprises:

an A/D converter for digitizing said video signal to provide a series of digitized video codewords at the rate of the sampling of said video signal for digitizing;

means, including a pair of memory means for temporarily storing two successive segments of said codeword series segment by segment, for interleaving said codewords of one segment with those of immediately neighboring segment, and

means for predictive encoding of the output of said interleaving means, to provide a series of codewords representative of the predictive encoding output alternately of the neighboring segments, and wherein said receiving unit comprises;

means for predictive decoding of the output of said predictive encoding means,

means, including a pair of memory means having a capacity equal to that of the memory means at the transmitting unit, for separating the predictive encoding output for one of the segments from that of the other of the segments through a signal processing inverse to that performed at said interleaving means, and

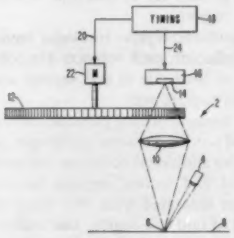
means for converting into an analog signal the output of said separating means.

4,173,772

SOLID STATE IMAGE SCANNING SYSTEM FOR PRODUCING A BINARY OUTPUT

James M. White, Mahopac, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1977, Ser. No. 866,192
Int. Cl.[2] H04N *3/14, 5/14*
U.S. Cl. 358—213 **3 Claims**



1. Apparatus for binarizing a scanned image having n, where n is an integer, lines of elements, comprising:

means for imaging a line at a time of elements in said image onto a line of light responsive charge transfer elements, with said charge transfer elements each producing a packet of charge comprised of photogenerated charge and thermally generated charge;

means for alternately changing the effective optical path length of each imaged line of elements between two values for alternately focusing and defocusing each line of elements of said image on said light responsive charge transfer elements;

a first charge transfer gating means for receiving in parallel said charge packets indicative of each alternately focused and defocused line of imaged elements from said light responsive charge transfer elements;

a first charge transfer shift register which has said charge packets indicative of each focused and defocused line of imaged elements alternately gated therein in parallel at a predetermined time from said first charge transfer gating means;

a second charge transfer gating means for receiving said charge packets indicative of each alternately focused and defocused line of imaged elements from said first charge transfer shift register, with said second charge transfer

gating means providing said charge packets indicative of each focused line of imaged elements at a first output, and each defocused line of imaged elements at a second output;

a second charge transfer shift register which receives one of said charge packets indicative of each focused and defocused line of imaged elements from either the first or the second output, respectively, of said second charge transfer gating means;

means for converting said charge packets indicative of each focused and defocused line of imaged elements at one of the first and second outputs of said second charge transfer gating means and the output of said second shift register, respectively, to a first and a second voltage, respectively; and

a comparator having a first input to which said first voltage is applied and a second input to which said second voltage is applied and having an output, with said comparator substantially cancelling the components of voltage in said first and second voltages which are produced by said thermally generated charge, and with said comparator providing a binarized signal at the output produced by the difference between the components of voltage in said first and second voltages produced by said photongenerated charge.

4,173,773

TAPE END ALARM FOR TAPE RECORDER

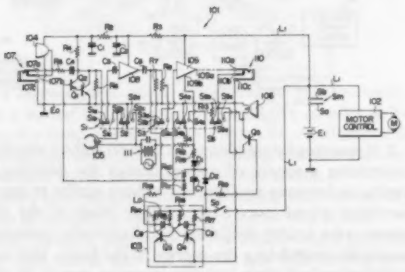
Ken Satoh, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 15, 1977, Ser. No. 860,849

Claims priority, application Japan, Dec. 23, 1976, 51-173647[U]; Dec. 24, 1976, 51-173608[U]

Int. Cl.² G11B *15/06, 23/30*

U.S. Cl. 360—67 **3 Claims**



1. A tape end alarm for a tape recorder of the type which includes change-over switch means movable between a record position, wherein said change-over switch means connects the output of a microphone to the input of an amplifier, and a playback position, wherein said change-over switch means connects the output of a magnetic head to said input of said amplifier, said tape end alarm comprising:

a tape end detection switch adapted to be closed upon the detection of a terminal end of a running tape being reached;

alarm oscillator means which is connected to said amplifier by said change-over switch means when said change-over switch means is in said record position and generates an oscillating signal responsive to the closure of said tape end detection switch;

an AGC circuit for controlling the gain of said microphone output when it is connected to said input of said amplifier; and

means for decreasing the gain of said AGC circuit responsive to the closure of said tape end detection switch by a sufficient amount to prevent a howling phenomena which may be caused by an audible alarm given off by said loudspeaker and fed through a closed loop including the loudspeaker, the microphone, the amplifier and back to the loudspeaker.

4,173,774

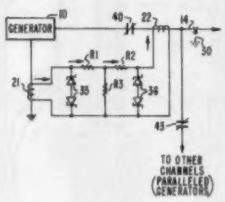
PARALLEL AC ELECTRICAL SYSTEM WITH DIFFERENTIAL PROTECTION IMMUNE TO HIGH CURRENT THROUGH FAULTS

Wayne E. Hyvarinen, American Township, Allen County, and Lloyd J. Rosell, Lima, both of Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 8, 1977, Ser. No. 858,863

Int. Cl.² H02H *3/28*

U.S. Cl. 361—87 **3 Claims**



1. An electrical power system comprising:

a plurality of multi-phase generators having outputs each connected with a plurality of phase conductors that are mutually interconnected in parallel for supplying at least one load, each of said generators also having a neutral conductor that is grounded proximate said generator;

at least one phase conductor and at least one of said generators having a differential protection network between said phase conductor and said neutral conductor of said one generator;

said differential protection network comprising

(a) means for deriving currents from said phase conductor and from said neutral conductor proportional to the respective currents in said conductors,

(b) voltage limiting means connected across each of said means for deriving current to prevent disablement of said differential protection network and to prevent nuisance tripping of said differential protection network upon occurrence of faults on the parallel connected load bus, and

(c) a first resistor in series with the means for deriving current from said phase conductor, a second resistor in series with said means for deriving current from said neutral conductor and a third resistor connected across said means for deriving currents and from between a common point of said first and second resistors, one of said first and second resistors providing an overcurrent voltage signal applied to an overcurrent sensing circuit which is in turn related to a differential protection inhibit circuit, said voltage limiting means having a limiting voltage magnitude of less than that of said overcurrent voltage signal that actuates said overcurrent sensing circuit, said voltage limiting means being directly connected in a circuit with said resistors and said means for deriving currents.

4,173,775

SELECTIVE EXCITATION OF COILS COMPRISING A SUPERCONDUCTING MAGNET

George D. Kneip, Jr., Menlo Park, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

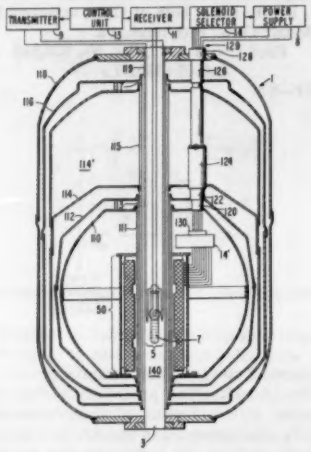
Filed Feb. 21, 1978, Ser. No. 879,293

Int. Cl.² H01H *47/00*

U.S. Cl. 361—141 **10 Claims**

1. In a superconducting magnet system, said system housed

in a cryostat and said system comprising means forming a superconductive solenoid to provide a main magnetic field and a plurality of gradient correcting superconducting coils, said solenoid means and each said gradient correcting coils adapted for selective excitation, a plurality of p persistence switch means to effect transitions between the persistent mode and the non-persistent mode, each said solenoid and gradient correcting coil separately controlled by a respective said persistence switch, the improvement comprising



a diode in series relationship with each said persistence switch means whereby a plurality of two-terminal directional persistence switching means is formed,

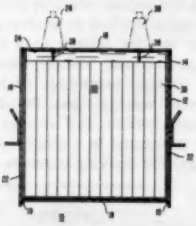
a number, n, of conductors, where $n<p$, for communicating between the exterior and the interior of said cryostat to control said switch means, each said n conductors contacting one terminal of each of $n(n-1)$ of said two-terminal directional switching means whereby the operation of a desired persistence switch is selectable from the exterior of said cryostat.

4,173,776

POWER CAPACITOR WITH AN INTERNAL SUPPORT STRUCTURE

George E. Mercier, Bloomington, Ind., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 8, 1977, Ser. No. 831,622
Int. Cl.[2] H01G 1/02
U.S. Cl. 361—272 **5 Claims**



1. A power capacitor apparatus with flammability risk avoidance comprising:

a containment casing having an upper portion including side walls and a cover and a lower portion including a base, said base being joined by a joint at its periphery to said side walls, said base and said joint being the parts of said casing which are susceptible to rupture when stressed by internal casing gas pressure induced by an internal fault;

an electrical assembly including a capacitor winding disposed within said casing;

bushings attached to said cover and connected by electrical leads to said electrical assembly;

a combustible, dielectric liquid filling said casing and impregnating said winding, said liquid occupying substantially the entire volume of said casing that is between said winding and said cover; and

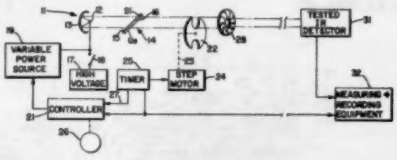
a cradle disposed within said casing for supporting said electrical assembly, said cradle comprising a generally U-shaped structure having a plurality of side members adjacent to and generally parallel with said side walls of said casing and a bottom member connected with said side members and located adjacent to and generally parallel with said base of said casing, said cradle being attached to said upper portion of said casing, said electrical assembly being retainable by said cradle upon rupture of either said casing's base or said joint to prevent substantial oxygen access to said fluid within said retained windings.

4,173,777

JET AIRCRAFT AND/OR MISSILE PLUME SIMULATOR

David E. Schmit, and Jon C. Richmond, both of Cincinnati, Ohio, assignors to Cincinnati Electronics Corporation, Cincinnati, Ohio

Filed Jun. 1, 1977, Ser. No. 802,549
Int. Cl.[2] F21V 33/00
U.S. Cl. 362—253 **15 Claims**



1. Apparatus for simulating jet aircraft and/or missile plumes comprising a source of optical energy for deriving a beam having an intensity and spectral content similar to those of the simulated plume over a wavelength band of the simulated plume, said source including an electrically powered lamp, means for modulating the energy of the beam, said means for modulating including variable aperture means in the beam path, and means for controlling the power applied to the lamp so that beams of at least two intensities are derived from the lamp.

4,173,778

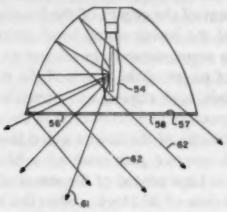
LIGHTING FIXTURES AND GLASS ENCLOSURE HAVING HIGH ANGLE ANTI-REFLECTION COATING

Carol J. Snavely, Santa Rosa, Calif.; Ian Lewin, Scottsdale, Ariz., and Edward A. Small, Jr., Santa Rosa, Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Continuation of Ser. No. 709,413, Jul. 28, 1976, abandoned. This application Feb. 21, 1978, Ser. No. 879,734
Int. Cl.[2] F21V 7/00
U.S. Cl. 362—297 **22 Claims**

1. In a lighting fixture, a housing having an open side, a fixture mounted in said housing and producing light rays passing through the open side, a glass enclosure carried by said housing and enclosing the open side and having at least one surface reflecting light rays at a high angle from the vertical, and an anti-reflection coating disposed on said surface, said

anti-reflection coating being comprised of a plurality of layers whose thicknesses have been selected for increasing the transmission of high angle light rays from said lamp, said high angle being 60° and above from the vertical.

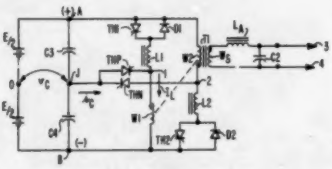


4,173,779

SINGLE-POLE COMMUTATION CIRCUIT

Alberto Abbondanti, Penn Hills, and Andress Kernick, Murrysville Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 8, 1978, Ser. No. 967,829
Int. Cl.² H02M *3/315*
U.S. Cl. 363—27 **6 Claims**



1. In a commutation circuit for alternately commutating a first and a second main thyristor connected in parallel across the poles of a direct current power source, the combination of:

a positive pole network for commutating said first thyristor in relation to the positive pole of said source;

a negative pole network for commutating said second thyristor in relation to the negative pole of said source;

said first thyristor when conductive establishing a first current path across said DC source, said first current path including in series a first inductor and a first primary winding;

said second thyristor when conductive establishing a second current path across said DC source, said second current path including in series a second inductor path and a second primary winding;

said first and second primary windings being driven in opposite directions;

a common secondary winding responsive to said first and second primary windings for outputting AC power converted by said first and second thyristors from said DC source;

said positive pole commutating network including a first capacitor associated with said positive pole, a first auxiliary thyristor, said first inductor and a first diode connected in antiparallel relation to said first thyristor;

said negative pole commutating network including a second capacitor associated with said negative pole, a second auxiliary thyristor, said second inductor and a second diode connected in antiparallel relation to said second thyristor;

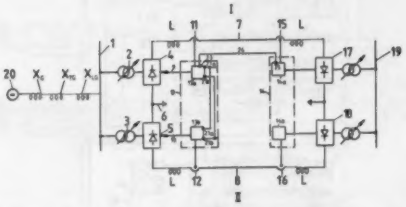
with said first and second capacitors and said first and second auxiliary thyristors having a common junction point.

4,173,780

METHOD AND APPARATUS FOR CONTROLLING THE REAL AND REACTIVE POWER BEHAVIOR OF A HIGH VOLTAGE D.C. TRANSMISSION (HDT) SYSTEM

Michael Häusler, Hirschberg, and Karl-Werner Kanngiesser, Viernheim, both of Fed. Rep. of Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Jan. 26, 1978, Ser. No. 872,628
Claims priority, application Fed. Rep. of Germany, Feb. 9, 1977, 2705242
Int. Cl.² H02H *7/00*; H02J *3/36*
U.S. Cl. 363—51 **13 Claims**



1. In a method for controlling the true and reactive power behavior of a high-voltage D.C. transmission (HDT) system having a rectifier station connected to a first three-phase network and an inverter station connected to a second three-phase network and to said rectifier station over a positive D.C. transmission line and a negative D.C. transmission line, each of said stations divided into two halves, said station-halves of each of said stations connected in common to ground or to a return wire, said station-half of each station connected together over said positive D.C. transmission line forming a positive pole, said station-halves connected over said negative D.C. transmission line forming a negative pole, each station equipped with current and voltage regulators as well as control angle and extinction angle regulators, each of said poles having protective devices to detect transmission disturbances caused by a system fault, whereby in the event of a tripping of one of said protective devices of a disturbed pole and a subsequent load drop in said disturbed pole there occurs an intervention of short duration in the regulation of the other intact pole, said intervention compensating for network transients and overvoltages resulting from said load drop by increasing the current set-point of said current regulator of the other intact station-half according to a preset function and by increasing the control angle set-point for the control angle regulator of the one intact station-half of said intact pole according to a preset function, the improvement comprising the steps of:

forming a new current set-point by storing in memories the pre-fault current set-points of both of said rectifier station halves,

comparing said stored current set point with a predetermined maximum-current value,

attaining a control angle limit (α_{min}) in said rectifier station of said intact station-half,

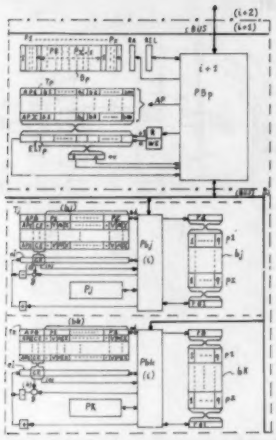
transferring control of said current regulation of said intact pole from said rectifier station to said inverter station of said intact pole after said control angle limit (α_{min}) is attained, and

subsequently increasing said control angle of the one intact station-half.

4,173,781
SYSTEM OF COHERENT MANAGEMENT OF EXCHANGES BETWEEN TWO CONTIGUOUS LEVELS OF A HIERARCHY OF MEMORIES

Lucien Cencier, Conflans St Honorine, France, assignor to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull, Paris, France

Filed Mar. 10, 1977, Ser. No. 776,359
Claims priority, application France, Mar. 10, 1976, 76 06879
Int. Cl.[2] G06F *13/00*; G11C *9/06*
U.S. Cl. 364—200 **4 Claims**



1. In a hierarchal memory data processing system having a plurality of memory levels, each level being divided in separate data blocks, a page of each block of a higher speed level equalling a fraction of a page of each block of the next lower speed level, and each block of the lower speed level being arranged for exchanging information with blocks of the higher speed level, a system of coherent management of the exchanges between any two contiguous levels, one of higher speed than the other, comprising

control processor means for managing said blocks at each level, said control processor means having at least one associated table containing status words for each block and means for updating said table responsive to each read-out and write-in request in said block and at each ejection of data from the block,

wherein each control processor of a block of the lower speed level selectively, when receiving a read-out request from a block of the higher speed level, on consultation of its table, purges the blocks of the higher speed level of the fractions of the data addressed in the read-out request by repatriating the copies of such fractions existing in the blocks of the said plurality, accompanied by a decreasing one of the count in said table, of the fractions of a block in said higher level which has not yet been repatriated to the lower level,

wherein each control processor of a block of the lower speed level selectively, when receiving a write-in request from a block of the higher speed level, on consultation of its table, updates the copies of fractions of the data addressed in said write-in request existing in the blocks of the higher speed level,

and wherein:

each table associated to a block of the lower speed level comprises as many entries as are pages in the block and, in each of its entries, comprises means to memorize the read-outs from the page corresponding to this entry and the identifications of the blocks of the higher speed level to which the read-outs send copies of fractions of the page, and,

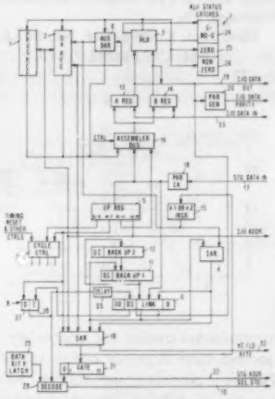
each table associated to a block of the higher speed level comprises as many entries as are pages in the block of the lower speed level with which it is in data exchange relation and, in each of its entries, comprises means to book an updated count of the copies of the fractions of the page of the block of the lower speed level corresponding to the entry and to concomitantly memorize an updated identification list of pages of the block of the higher speed level which contain such copies, and comprises means for signalling the passage to zero of each of the said counts to the respective blocks of the lower speed level,

whereby each control processor of a block of the lower speed level is kept posted of the status of the copies of all fractions of data of its block within the blocks of the said plurality of the higher speed level.

4,173,782
RETURN AND LINK MECHANISM

Jerry D. Dixon, Boca Raton, Fla., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 3, 1978, Ser. No. 866,425
Int. Cl.[2] G06F *9/18*
U.S. Cl. 364—200 **3 Claims**



1. For use in a data processing system, apparatus for linking between separate computer programs comprising:

register means for storing an indication of an address of an instruction; and

return means, responsive to a particular format of instruction within said programs, said return means cooperating with said register means for causing a branch to the instruction which is at the address indicated by said register means and for causing said register means to store an indication of the address of an instruction which follows the instruction having said particular format.

4,173,783
METHOD OF ACCESSING PAGED MEMORY BY AN INPUT-OUTPUT UNIT

John F. Couleur, Scottsdale, and Robert E. Scriver, Phoenix, both of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Continuation-in-part of Ser. No. 591,549, Jun. 30, 1975, abandoned. This application May 2, 1977, Ser. No. 792,964
Int. Cl.[2] G06F *3/00, 9/20*
U.S. Cl. 364—200 **2 Claims**

1. A method of operating an electronic data processing system for accessing paged data locations, said system employing a main memory having data locations defined by absolute addresses, a central processing unit, an input-output unit having a plurality of peripheral channels, and a plurality of periph-

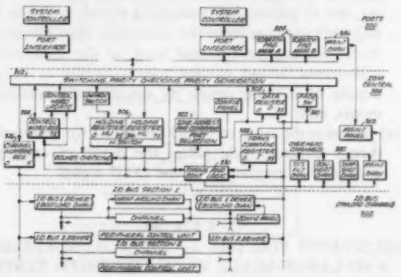
eral devices each communicating with said main memory through one of said peripheral channels of said input-output unit, said method comprising the steps of:

(a) segregating by operation of said central processing unit data locations in a portion of said main memory into memory pages, with each page comprising a plurality of contiguous memory locations and with the address location of each page in said main memory being identified by a page table word;

(b) denoting by operation of said central processing unit the address location of a first memory page containing data locations to be accessed by a selected one of said peripheral channels by a first page table word and loading said first page table word into a page table in another portion of said main memory;

(c) assigning through operation of said central processing unit a unique peripheral control word to said selected peripheral channel and storing said peripheral control word in said main memory, said peripheral control word including as a portion thereof a page table pointer for identifying the address location in said main memory of said page table;

(d) assigning through operation of said central processing unit a data control word to said selected peripheral channel, said data control word including a first portion denoting an offset location of said first page table word in said page table and said data control word further including a second portion denoting an offset location of a specific



data location to be accessed within said first memory page;

(e) loading said data control word into a second memory page in said main memory;

(f) denoting by operaton of said central processing unit the address location of said second memory page containing said data control word by a second page table word and loading said second page table word into said page table;

(g) assigning by operation of said central processing unit and storing in said main memory, a list pointer word, said list pointer word including a first portion denoting an offset location of said second page table word in said page table and a second portion denoting an offset location of said data control word within said second memory page;

(h) combining in said input-output unit said first portion of said list pointer word with said page table pointer to determine the absolute address in said memory of said second page table word;

(i) combining in said input-output unit said second portion of said list pointer word with said second page table word to determine the absolute address of said data control word;

(j) combining in said input-output unit said first portion of said data control word with said page table pointer to determine the absolute address in said main memory of said first page table word; and

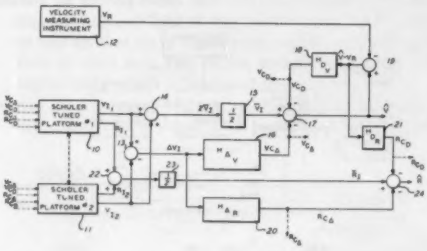
(k) combining in said input-output unit said second portion of said data control word with said first page table word to determine the absolute address in said main memory of said specific data location.

4,173,784

INERTIAL SYSTEM HAVING CORRECTION MEANS FOR EFFECTS OF GRAVITATIONAL ANOMALIES

William H. Heath, Wayne, N.J., and Jack Richman, Forest Hills, N.Y., assignors to The Singer Company, Little Falls, N.J.

Filed Aug. 29, 1977, Ser. No. 828,730
Int. Cl.[2] G06G 7/78
U.S. Cl. 364—453 **8 Claims**



7. In an inertial navigation system having a first Schuler tuned platform and a second Schuler tuned platform displaced a predetermined distance apart, a plurality of summing, differencing and gain circuits interconnecting the output signals of each Schuler tuned platform, a plurality of identical transfer function circuits comprising summing, differencing and gain circuit and a velocity measuring circuit, the method of correcting for the effects of gravitational anomaly errors comprising:

separating the first and second Schuler tuned platforms a predetermined distance apart,

using the summing, differencing and gain circuits to combine the position and velocity output signals of said first Schuler tuned platform with the position and velocity output signals of said second Schuler tuned platform to obtain signals representative of average inertial platform velocity, average inertial platform position and inertial platform residual velocity,

using summing and differencing circuits of the transfer circuits to combine said average inertial platform position signal with a first and second position correcting signal, and

using said summing and differencing circuits of said transfer function circuit to combine said average inertial platform velocity signal with a first and second velocity correcting signal to obtain estimated system position and velocity signals corrected for gravitational anomalies.

4,173,785

INERTIAL GUIDANCE SYSTEM FOR VERTICALLY LAUNCHED MISSILES WITHOUT ROLL CONTROL

William H. Licata, Stone Mountain, Ga., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 25, 1978, Ser. No. 909,326
Int. Cl.[2] G06F 15/50
U.S. Cl. 364—453 **16 Claims**

1. An ordnance guidance system for use with an external target localization means wherein said target localization means provides pre-launch target bearing, range, and elevation angle information to said ordnance relative to an inertial coordinate system centered at the intended target including "x", "y", and "z" mutually orthogonal axes, comprising:

a pitch rate sensor;

a yaw rate sensor;

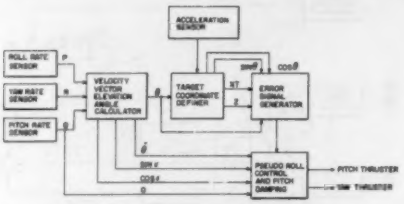
a roll rate sensor;

an acceleration sensor for measuring the component of acceleration in the direction of said ordnance's centerline;

means coupled to said pitch, yaw, and roll rate sensors for determining the elevation angle of said ordnance's veloc-

ity vector, and for producing a signal proportional to the rate of change of the elevation angle of said velocity vector, and for producing signals proportional to the sine and cosine of the bearing angle of said target within said inertial coordinate system;

means coupled to said acceleration sensor and to said velocity vector elevation angle determining means for defining target coordinates in a target plane including said "z" axis and said target, and for producing signals proportional to the sine and cosine of said velocity vector elevation angle;



means coupled to said target coordinate defining means for developing a thruster error signal proportional to the difference between said target elevation angle and said elevation angle of said velocity vector; and

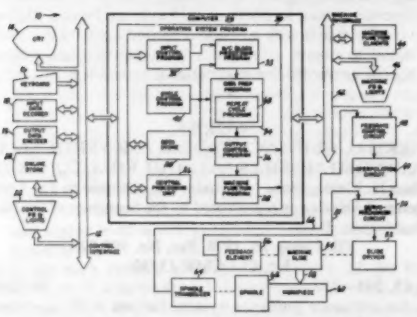
means coupled to said pitch rate sensor, said velocity vector elevation angle determining means, and said thruster error signal developing means for producing pitch and yaw thruster commands, whereby said pitch and yaw thruster commands cause said ordnance's velocity vector to continuously be corrected to point toward said target while said ordnance is constrained to fly in said target plane.

4,173,786

METHOD AND APPARATUS FOR CUTTING A THREAD ON A ROTATING WORKPIECE

Thomas J. Kuhnell, Branch Hill; Randall C. Tanner, Lebanon, and Alois V. Dryak, Glendale, all of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Jun. 23, 1977, Ser. No. 809,280
Int. Cl.[2] G06F *15/46*; G05B *19/24*
U.S. Cl. 364—475 **10 Claims**



1. An apparatus for cutting threads with a numerical control and turning machine system wherein a cutting tool moves from a start point, along an X-axis perpendicular to the center line of a workpiece and along a Z-axis parallel to the center line of the workpiece in synchronization with the rotation of the workpiece, said thread being cut in response to an input program by iteratively moving the cutting tool relative to the workpiece through a number of thread cutting cycles, the apparatus comprising:

(a) means resonsive to the input program for generating input signals including

(1) a DIN_p signal representing an initial depth increment,

(2) a DTH signal representing a signed number defining the total depth of the thread,

(3) a TAA signal representing the tangent of the attack angle between the X-axis and a locus of points defined by thread start points,

(4) position signals defining the final exit position of the cutting tool after a first thread cutting pass, said final exit position being coincident with the start point,

(5) lead and angular spindle velocity signals defining the linear velocity of the cutting tool along the X and Z-axes, and

(6) a rapid signal defining a displacement along the X-axis to a first thread start point for the first thread cutting pass;

(b) means responsive to the rapid, lead, angular spindle velocity, and position signals for generating first command signals to cause the cutting tool to move from the start point, through the first thread cutting pass and back to the start point, said first thread cutting pass having a depth of cut equal to the rapid value;

(c) means responsive to the TAA, DIN_p, rapid, lead, angular spindle velocity, and position signals for providing second command signals to cause the cutting tool to move from the start point, through a second thread cutting pass and back to the start point, said second thread cutting pass having a depth of cut equal to the sum of the rapid and the DIN_p signals;

(d) means responsive to the TAA, DIN_p, DTH, rapid, lead, angular spindle velocity, and position signals for producing sets of subsequent command signals to cause the cutting tool to move from the start point through subsequent thread cutting passes, and back to the start point, said subsequent thread cutting passes having corresponding depths of cut increasing by successively smaller increments, and

(e) means responsive to the DTH signal for terminating the thread cutting cycle when the depth of cut equals or exceeds the magnitude of the DTH signal.

4,173,787

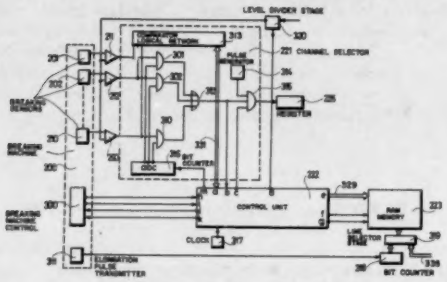
EQUIPMENT FOR THE AUTOMATIC, SUPER-SPEED, AND LARGE-SCALE YARN-STRENGTH TESTING

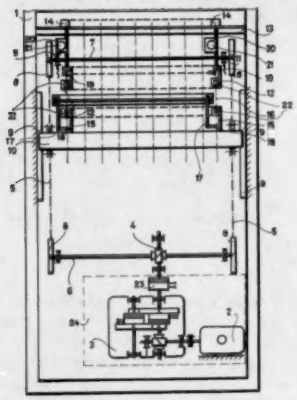
Tibor Katona; Tamas Kenderesy; Imre Nemes; Agoston Erdelyi, and Jozsef Ragalyi, all of Budapest, Hungary, assignors to Textilipari Kutato Intezet, Budapest, Hungary

Filed Oct. 11, 1977, Ser. No. 842,329
Claims priority, application Hungary, Oct. 12, 1976, TE 860
Int. Cl.[2] G01N *3/00*; G06F *15/46*
U.S. Cl. 364—550 **8 Claims**

1. In an equipment for the automatic, super-speed, and large-scale yarn-strength testing comprising a control unit for the concerted control of both the breaking process and the processing of the measured data, means for supplying electric signals proportional to the values of the breaking force and the elongation, respectively the said means being connected to at least one data processing unit(s) whereas the latter one(s) is (are) connected to a display and/or printing device, and the data processing unit(s) and the control unit are coupled to a computer the improvement in which n pieces (n being a positive integer) of breaking units each of them comprising at least one sensor (**201** . . . **210**) are mounted upon a common supporting block and coupled to a single, common, program-controlled drive (**24**) the program controlled inputs of which being connected to the outputs of the said control unit (**222**), and a data processing and control network is incorporated into the equipment comprising a RAM-memory (**223**) which is coupled over an address channel (**329**), a read-in control channel, and a readout control channel to the said control unit (**222**), and over its data output to the inputs of a first and a second register (**224** and **225**), the outputs of the said registers (**224**, **225**) are coupled to the inputs of an adder stage (**226**), and the output of the second register (**225**) is also connected to the data input of the

said RAM-memory (223), the output of the said adder stage (226) is connected to a D/A converter (227), and the output of the D/A converter (227) is connected to a set of comparators (211 . . . 220) over one of their data inputs whereas the other data inputs of the said comparators (211 . . . 220) are separately





connected to one of the said sensors (201 . . . 210) each, and the outputs of the said comparators (211 . . . 220) are connected to the input of a channel selector (221) which is coupled with the said control unit (222) and the output of which is coupled to one of the inputs of the second register (225).

4,173,788

METHOD AND APPARATUS FOR MEASURING DIMENSIONS

Theodore A. Laliotis, Los Altos, Calif., assignor to Atmospheric Sciences, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 727,042, Sep. 27, 1976. This application Sep. 26, 1977, Ser. No. 836,615

Int. Cl.[2] G01B *11/10*; G06F *15/20*

U.S. Cl. 364—560 **10 Claims**

1. Structure comprising:

means for producing one measure of a field of view without an object present and for producing another measure of the field of view with an object present, said means for producing comprising:

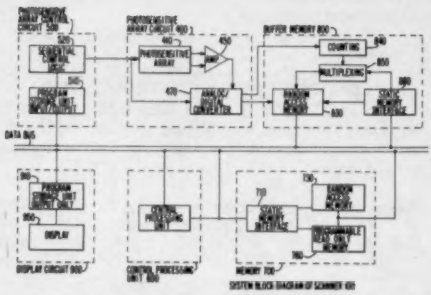
photosensitive array means for receiving light representing the field of view without an object present and for producing from said light one set of intermediate signals representative of said field of view without an object present, said one set of intermediate signals comprising said one measure, and for receiving light representing the field of view with an object present and for producing from said light another set of intermediate signals representing said field of view with said object present, said another set of intermediate signals comprising said another measure;

means for controlling said photosensitive array means to produce in sequence said one set of intermediate signals and said another set of intermediate signals; and

means for converting said one set and said another set of intermediate signals produced by said photosensitive array means to one set and another set of digital code words respectively,

means for storing either said one set of digital code words representing said field of view without said object present, or said another set of digital code words representing said field of view with said object present, whichever set of digital code words is produced first in time;

means for processing said one set of digital code words and said another set of digital code words to produce an inter-



mediate set of digital code words indicative of the change of the field of view between the time of producing said one measure and the time of producing said another measure, wherein said intermediate set of digital code words is also indicative of selected characteristics of said object;

means for storing said intermediate set of digital code words;

means for processing said intermediate set of digital code words to obtain a measure of a selected characteristic of said object in said field of view;

means for deriving from either said one set of digital code words or said another set of digital code words, whichever is produced first in time, and said intermediate set of digital code words, both an indication of the presence or absence of an object at a selected time, and a selected dimension of said object; and

means for displaying said selected dimension of said object.

4,173,789

MULTIPLICATION CONTROL SYSTEM

Haruhisa Miura, Hino, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Dec. 28, 1977, Ser. No. 865,211

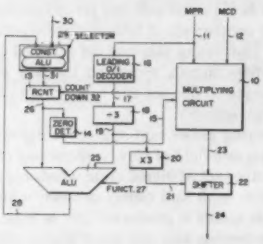
Claims priority, application Japan, Dec. 23, 1976, 51-154177

Int. Cl.[2] G06F *7/52*

U.S. Cl. 364—760 **11 Claims**

1. A multiplication control system comprising a recursive multiplying circuit to which a binary-coded multiplier and a binary-coded multiplicand are supplied, a detection portion which detects the number of continuous "0" or "1" bits adjacent the most or least significant digit to detect the number of those significant digits in said multiplier which need to be operated, means to determine the number of recursive opera-

tions required of said multiplying circuit in correspondence with the detected number of said digits, and means to execute



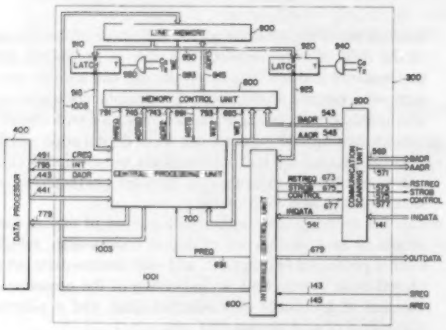
said recursive operations in accordance with said determined number of said operations.

4,173,790

COMMUNICATION CONTROL SYSTEM

Masahiro Abe, Sayama; Yoshiaki Eifuku, Hatano, and Toshio Kajiwara, Yokohama, all of Japan, assignors to Hitachi, Ltd. and Nippon Telegraph and Telephone Public Corporation, both of, Japan

Filed Sep. 12, 1977, Ser. No. 832,584
Claims priority, application Japan, Sep. 10, 1976, 51-107754
Int. Cl.[2] G06F *3/04*
U.S. Cl. 364—900 **9 Claims**



5. In a communication control system including a data processor, a plurality of modems, a line control unit forming a plurality of communication channels each connected to a respective modem, and a communication control unit for controlling transfer of data between said data processor and selected communication channels in said line control unit, the improvement comprising

first and second address signal generator means in said communication control unit each generating the same address signals identifying said communication channels continuously during a predetermined scanning period and cyclically with a predetermined repetition period, the address signals generated by said second address signal generator means being delayed with respect to the address signals generated by said first address signal generator means by a predetermined delay time;

a plurality of line adapters each including first and second switching means in said line control unit for transferring data to and from a selected modem, respectively; and

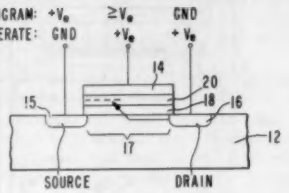
first and second decoder means in said line control unit responsive to the address signals generated by said first and second address signal generator means, respectively, for generating first and second enabling signals, respectively, which enable said respective first and second switching means in a selected line adapter.

4,173,791

INSULATED GATE FIELD-EFFECT TRANSISTOR READ-ONLY MEMORY ARRAY

Antony G. Bell, Sunnyvale, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Sep. 16, 1977, Ser. No. 834,016
Int. Cl.[2] G11C *11/40*
U.S. Cl. 365—182 **18 Claims**



6. A method of programming a random-access semiconductor memory array having a common line, a plurality m of x lines, a plurality n of y lines and a plurality of IGFET's wherein each IGFET is connected to one x line and one y line, transistor T_{ab} being connected to line a and line b, wherein $0<a\leqq m$ and $0<b\leqq n$, wherein each IGFET includes:

a substrate of one conductivity type;

spaced-apart source and drain regions formed in the substrate, each of opposite conductivity to the substrate;

a gate insulating region formed on the substrate between the source and the drain;

an electrically conductive gate electrode formed on the gate insulating region between the source and the drain; and

means for defining a state in the IGFET by applying electrical signals to the source, the drain, and the gate electrode to introduce change into and store charge in the gate insulating region predominantly toward one of the source or the drain regions; and

transistor T_{ab} is programmed by the following steps:

applying a first potential to the common line, the x lines and the y lines,

applying a second potential to the common line,

applying a third potential to all y lines except line b,

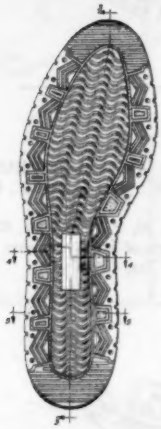
applying a fourth potential to line a to activate the means for defining a state in the IGFET.

253,316
FABRIC SHOE
L. Perry Hull, 952 12th St., NE., Mason City, Iowa 50401
Filed Aug. 29, 1977, Ser. No. 828,338
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—273

253,317
SHOE
Rino Negrin, Selva del Montello, Italy, assignor to Sports Enterprises, Inc.
Filed Dec. 5, 1977, Ser. No. 857,122
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

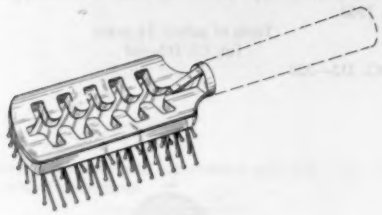
253,318
SHOE HEEL PROTECTOR
Michael Maccario, 336 Huntley Rd., Upper Darby, Pa. 19082
Filed Oct. 20, 1977, Ser. No. 844,119
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—314

253,319
SOLE FOR FOOTWEAR
Armin A. Dassler, Ringstrasse 121, D-8522 Herzogenaurach, Fed. Rep. of Germany
Filed Feb. 13, 1978, Ser. No. 877,358
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1977, 7363
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320

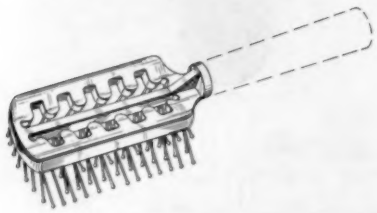


253,320
STRAP RETAINER
Ronald J. Adams, 12311 Kent Ct., Southgate, Mich. 48195
Filed Jun. 27, 1977, Ser. No. 810,024
Term of patent 14 years
Int. Cl. D02—*07*
U.S. Cl. D2—447

253,321
HEAD FOR A HAIR BRUSH
Robert E. Saute, 10236 Mossy Rock Cir., Los Angeles, Calif. 90024
Filed Jan. 30, 1978, Ser. No. 873,406
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—35



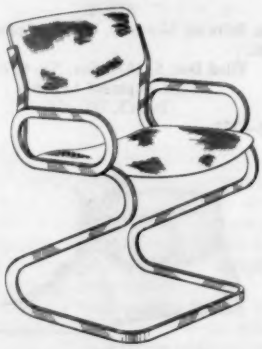
253,322
HEAD FOR A HAIR BRUSH
Robert E. Saute, 10236 Mossy Rock Cir., Los Angeles, Calif. 90024
Filed Jan. 30, 1978, Ser. No. 873,723
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—35



253,323
SUPPORT STAND FOR A LOUDSPEAKER
Thea Blatzer, Lichtenfels; Willfried Ender, and Gerhard Ketnath, both of Neuensee, all of Fed. Rep. of Germany, assignors to Firma Andreas Hofmann Metallwarenfabrik, Fed. Rep. of Germany
Filed Apr. 28, 1977, Ser. No. 792,022
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—25

253,324
SEAT
Camilo Lopez, III, Coral Gables, Fla., assignor to Camilo Muebles, Inc., Coral Gables, Fla.
Filed Nov. 7, 1977, Ser. No. 849,492
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47

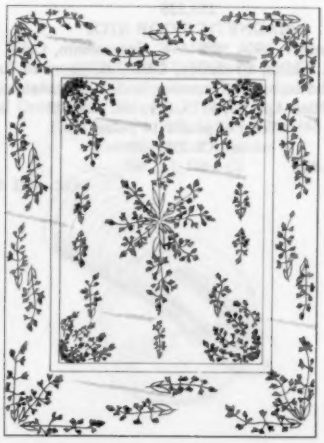
253,325
SIDE ARM CHAIR
George E. Gasser, 6455 Sodom-Hutchings Rd., Girard, Ohio 44420, and Alberto Ranucci, 9 Skye Ct., Downsview, Ontario, Canada (M-3N-1T5)
Filed Jul. 21, 1977, Ser. No. 818,272
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—56



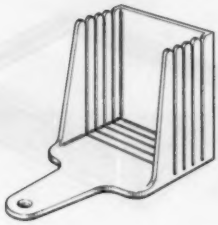
253,326
SOFA
Barry Brukoff, 201 Valley Rd., Sausalito, Calif. 94965
Filed Jun. 17, 1977, Ser. No. 807,363
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—61

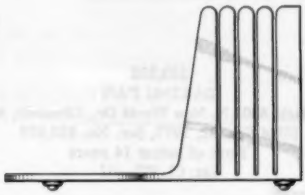
253,327
CABINET
Jerry L. Johnson, Rancho Cuerdo, Box 50, Potrero, Calif. 92063
Filed Dec. 5, 1977, Ser. No. 857,409
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—168

253,328
RUG
James S. Thompson, 10616 Dunkirk Dr., Silver Spring, Md. 02209
Filed Oct. 6, 1977, Ser. No. 840,117
Term of patent 14 years
Int. Cl. D6—*11*
U.S. Cl. D6—210

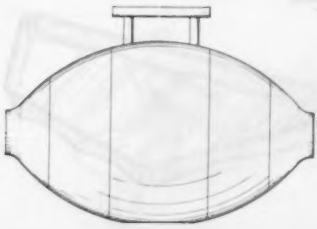


253,329
BREAD SLICING GUIDE
Kenneth H. Latham, 475 Linden Dr., Idaho Falls, Id. 83401
Filed Nov. 21, 1977, Ser. No. 853,643
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—46

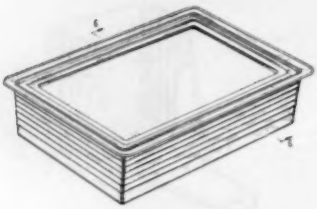




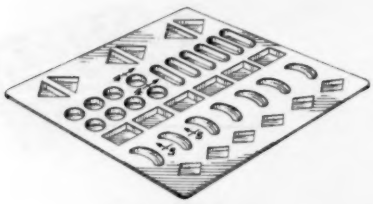
253,330
LUNCH PAIL OR SIMILAR ARTICLE
Earl W. Weaver, Rte. 1, Box 72, McIntosh, Ala. 36553
Filed Mar. 25, 1976, Ser. No. 670,101
Term of patent 14 years
Int. Cl. D03—*01*
U.S. Cl. D7—76



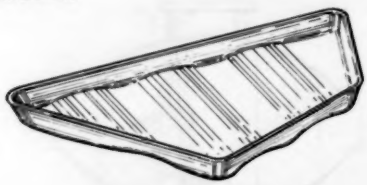
253,331
FOOD CONTAINER
Hans J. Olschewski, Berlin, Fed. Rep. of Germany, assignor to FKF Fleischwaren- und Konserven-Fabrik, Schultz & Berndt GmbH & Co. KG, Berlin, Fed. Rep. of Germany
Filed Jun. 3, 1977, Ser. No. 803,404
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—76



253,332
BAKING PAN
Frances E. Rich, 8802 N. New World Dr., Glendale, Ariz. 85302
Filed Sep. 22, 1977, Ser. No. 835,839
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—96



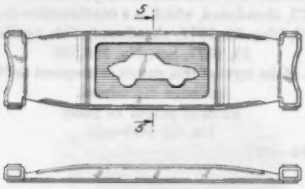
253,333
BAKING PAN
Paul S. Carr, III, and Carolyn M. Carr, both of 1817 La Fromboise St., Enumclaw, Wash. 98022
Filed Oct. 11, 1977, Ser. No. 841,154
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—96



253,334
KNIFE OR SIMILAR ARTICLE OF FLATWARE
Robert J. King, Wallingford, Conn., assignor to International Silver Company, Meriden, Conn.
Filed Oct. 3, 1977, Ser. No. 838,930
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

253,335
MAGNETIC DOOR STOP
Ralph J. Gauntner, 2404 38th Ave., Sacramento, Calif. 95822, and Alec A. Shilin, Broderick, Calif., assignors to Ralph J. Gauntner and Isabell L. Gauntner, both of Sacramento, Calif.
Filed Apr. 20, 1977, Ser. No. 789,008
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—402

253,336
PUSH BAR FOR DOORS OR THE LIKE
Farrell DeWindt, 13312 Terry Dr., Utica, Mich. 48087
Filed Aug. 10, 1977, Ser. No. 823,210
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—404

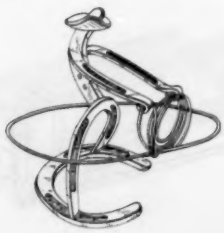


253,337
DISPENSING CONTAINER FOR LIQUIDS OR THE LIKE
Saul Bass, 337 S. Las Palmas Ave., Los Angeles, Calif. 90005, and Arthur J. Goodman, 840 N. Larrabee St., Los Angeles, Calif. 90069
Filed Jul. 7, 1977, Ser. No. 813,748
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—139

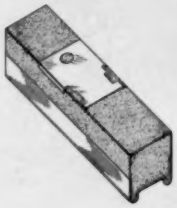
253,338
CONTAINER END PANEL
Gary K. Hasegawa, Morton Grove, Ill., assignor to The Continental Group, Inc., New York, N.Y.
Filed Feb. 7, 1977, Ser. No. 766,468
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—253

253,339
STATUETTE
Goldie M. Cloyd, Road 14W, Loami, Ill. 62661
Continuation-in-part of Ser. No. 729,327, Nov. 5, 1976, abandoned. This application Nov. 20, 1978, Ser. No. 962,250
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—157

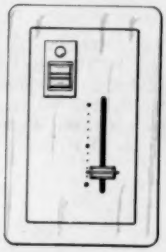
253,340
FIGURINE
Robert E. Friedrich, 218 Smith St., Columbus, Tex. 78934
Filed May 19, 1977, Ser. No. 798,597
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160



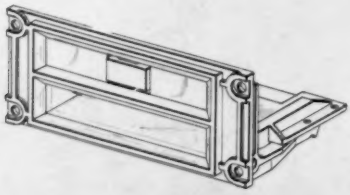
253,341
SOLID STATE PROTECTOR FOR COMMUNICATIONS CIRCUITS OR SIMILAR ARTICLE
John J. Barta, Jr., 1417 Danes Dr., West Covina, Calif. 91791
Filed Oct. 2, 1978, Ser. No. 947,765
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—11



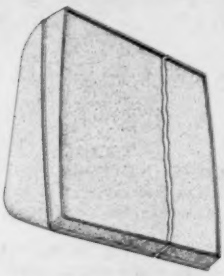
253,342
REMOTE DIMMING CONTROL SYSTEM
Noel Mayo, Philadelphia, Pa., assignor to Lutron Electronics Co., Inc., Coopersburg, Pa.
Division of Ser. No. 726,524, Sep. 27, 1976, Pat. No. D. 249,141.
This application Mar. 8, 1978, Ser. No. 884,613
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32



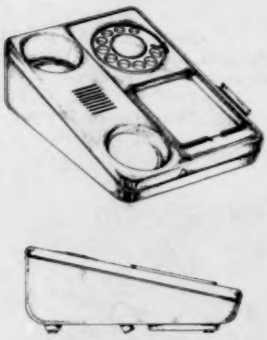
253,343
CARTRIDGE DRIVE
Loren A. Schultz, Dresher, and Alexander Hunter, Chalfont, both of Pa., assignors to Transaction Management, Inc., Montgomeryville, Pa.
Filed Jan. 25, 1978, Ser. No. 872,595
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—40



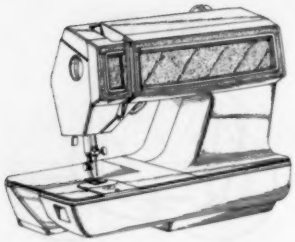
253,344
TELEPHONE STAND
Donald M. Genaro, Haworth, N.J.; John N. McGarvey, Drexel Hill, Pa., and Gordon E. Sylvester, Jamaica, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Division of Ser. No. 604,592, Aug. 14, 1975, which is a continuation-in-part of Ser. No. 469,855, May 14, 1974, Pat. No. D. 237,506, which is a continuation-in-part of Ser. No. 424,413, Dec. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 364,704, May 29, 1973, abandoned. This application Nov. 23, 1977, Ser. No. 854,503
The portion of the term of this patent subsequent to Nov. 4, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—60



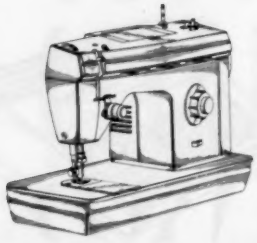
253,345
BASE FOR TELEPHONE SET
Clifford D. Read, Almonte; Robert E. Hillmer, Carleton Place, and John F. Tyson, Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada
Filed Sep. 19, 1977, Ser. No. 834,833
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—60



253,346
SEWING MACHINE FRAME OR SIMILAR ARTICLE
Donald M. Genaro, Haworth, N.J.; Cristjan J. Felix, Flushing, N.Y.; William L. Herron, Elizabeth, and Kenneth D. Adams, Madison, both of N.J., assignors to The Singer Company
Filed Feb. 28, 1978, Ser. No. 881,997
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—69

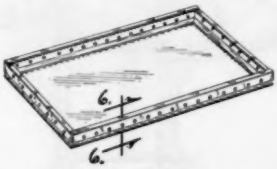


253,347
SEWING MACHINE
Cristian J. Felix, Flushing, N.Y., assignor to The Singer Company
Filed Mar. 28, 1977, Ser. No. 781,899
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—70

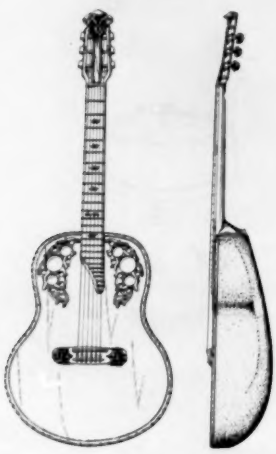


253,348
STEAM SELF CONTAINED KETTLE
William M. Bardeau, 158 Norfinch Dr., Downsview, Ontario, Canada (M3N 1Y1)
Filed Jun. 13, 1977, Ser. No. 804,082
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—104

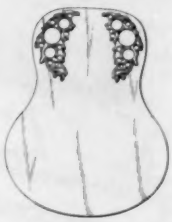
253,349
LINER FOR SPENT NUCLEAR FUEL POOLS
Ralph L. Jennings, Des Moines, Iowa, assignor to Economy Forms Corporation, Des Moines, Iowa
Filed Sep. 6, 1977, Ser. No. 830,903
Term of patent 14 years
Int. Cl. D15—*09*; D25—*01*
U.S. Cl. D15—136



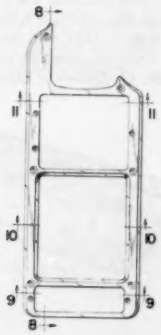
253,350
GUITAR
Charles H. Kaman, Prattling Pond Rd., Farmington, Conn. 06032
Filed Jan. 27, 1977, Ser. No. 763,230
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D17—19



253,352
GUITAR SOUNDBOARD
Charles H. Kaman, Prattling Pond Rd., Farmington, Conn. 06032
Filed Jan. 27, 1977, Ser. No. 763,229
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D17—20

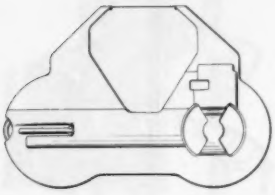


253,351
STRINGED INSTRUMENT BEZEL
James H. Rickard, Harwinton, Conn., assignor to Ovation Instruments, Inc., New Hartford, Conn.
Filed Jan. 19, 1977, Ser. No. 760,743
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D17—20



253,353
TYPEWRITER
John E. Jolliffe, Manlius, N.Y., assignor to SCM Corporation, New York, N.Y.
Filed Feb. 6, 1978, Ser. No. 875,467
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—1

253,354
CARTRIDGE FOR A TYPEWRITER
Edwin J. Lenney, and John O. Schaefer, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.
Continuation-in-part of Ser. No. 801,289, May 27, 1977, abandoned, and a continuation-in-part of Ser. No. 801,288, May 27, 1977, abandoned. This application Oct. 10, 1978, Ser. No. 950,093
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—12

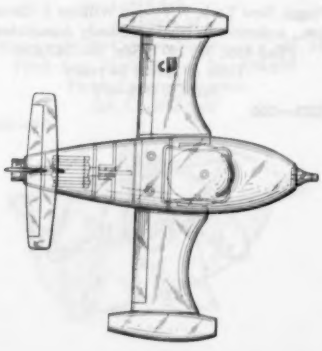


253,355
MONOGRAM FONT
Lars G. Rosenblad, Huskvarna, Sweden, assignor to Husqvarna AB, Huskvarna, Sweden
Filed Apr. 28, 1977, Ser. No. 792,037
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D18—24

253,356
MONOGRAM
Lars G. Rosenblad, Huskvarna, Sweden, assignor to Husqvarna AB, Huskvarna, Sweden
Filed Apr. 28, 1977, Ser. No. 792,038
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D18—24

253,357
MONOGRAM
Lars G. Rosenblad, Huskvarna, Sweden, assignor to Husqvarna AB, Huskvarna, Sweden
Filed Apr. 28, 1977, Ser. No. 792,040
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D18—24

253,358
TOY AIRPLANE
Mel Appel, 9 Nottingham Rd., Livingston, N.J. 07039
Filed Jun. 20, 1977, Ser. No. 808,245
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—87

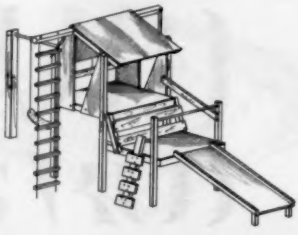


253,359
ACTION DOLL
E. Dean Walker, 823 Patricia Dr., San Antonio, Tex. 78216
Filed Nov. 16, 1977, Ser. No. 851,868
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—150

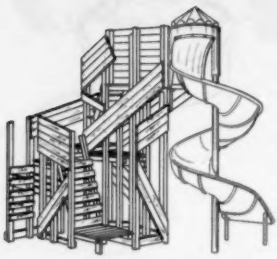
253,360
DOLL
Dietmar Nagel, New York, N.Y., and William J. Baron, Middleton, Mass., assignors to Nagel-Kennedy Associates
Filed Oct. 31, 1977, Ser. No. 847,139
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—166

253,361
SKI
Rudolf Ferch, Salzburg, Austria, assignor to Kastle Gesellschaft m.b.H., Austria
Filed Apr. 27, 1977, Ser. No. 791,594
Claims priority, application Austria, Oct. 28, 1976, 25165372/76
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—229

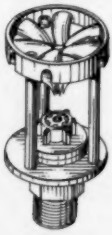
253,362
PLAYGROUND STRUCTURE
Berthold B. Dieter, and Charles L. Gibson, both of Terre Haute, Ind., assignors to Creative Playgrounds Corporation, Terre Haute, Ind.
Filed Dec. 21, 1977, Ser. No. 862,938
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D21—243



253,363
PLAYGROUND STRUCTURE
Berthold B. Dieter, and Charles L. Gibson, both of Terre Haute, Ind., assignors to Creative Playgrounds Corporation, Terre Haute, Ind.
Filed Nov. 17, 1977, Ser. No. 852,582
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D21—244

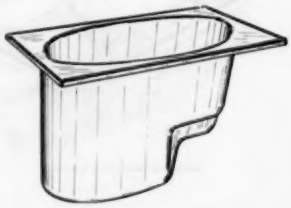


253,364
SPRINKLER HEAD
William J. McFadden, Orange County, Fla., assignor to Senninger Irrigation, Inc., Orlando, Fla.
Filed Aug. 21, 1978, Ser. No. 935,731
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—6

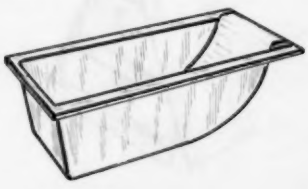


253,365
BALL VALVE
Gustav B. Nyberg, Säffle, Sweden, assignor to AB Källe-Regulatorer, Säffle, Sweden
Filed Apr. 22, 1977, Ser. No. 790,143
Claims priority, application Sweden, Oct. 25, 1976, 76-2062
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

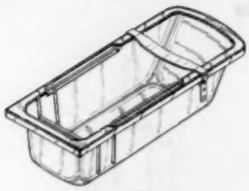
253,366
BATHTUB
Albert R. Weaver, 15001 Calvert, Van Nuys, Calif. 91411
Filed Aug. 30, 1978, Ser. No. 938,054
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



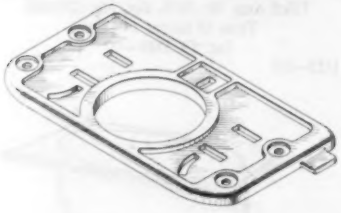
253,367
BATHTUB
Albert R. Weaver, 15001 Calvert, Van Nuys, Calif. 91411
Filed Aug. 30, 1978, Ser. No. 938,055
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



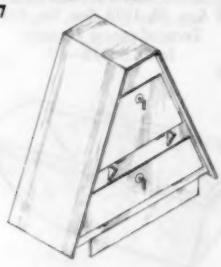
253,368
BATHTUB
Hans A. V. Johansson, Trehiradsvägen 36, Eslöv, Sweden
Filed Oct. 10, 1978, Ser. No. 949,679
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



253,369
WATER CLOSET TANK UNIVERSAL ADAPTOR PLATE
Alexander Koelble, and Paul Staehli, both c/o: Geberit AG, CH-8640 Rapperswil, Switzerland
Filed Aug. 26, 1977, Ser. No. 828,130
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—69

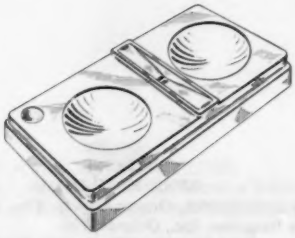


253,370
STOVE
Thomas R. Chalmers, 910-1305 Taylor Ave., Winnipeg, Canada (R3M 2K5)
Filed Oct. 6, 1977, Ser. No. 839,999
Claims priority, application Canada, Apr. 20, 1977, 2004771
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



253,371
VAPORIZER FOR A COMBUSTION SYSTEM
Jerome Schrank, Brooklyn, N.Y., assignor to Allied Energy Corp., Beverly Hills, Calif.
Filed Mar. 25, 1977, Ser. No. 781,136
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127

253,372
DENTAL MIXING SLAB
Thomas J. Mayclin, 2629 Louisiana Ave., Minneapolis, Minn. 55426
Filed Jun. 22, 1977, Ser. No. 808,913
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—10



253,373

FOOT MASSAGE ROLLER

Victor Celeste, Toronto, Canada, assignor to 369403 Ontario Limited, Toronto, Canada

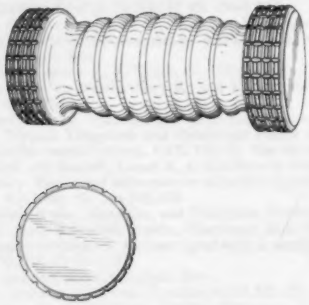
Filed Oct. 18, 1977, Ser. No. 843,491

Claims priority, application Canada, Sep. 16, 1977, 1609777

Term of patent 14 years

Int. Cl. D28—*03*

U.S. Cl. D24—36



253,374

LUBRICANT DEVICE

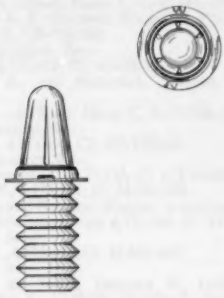
Joseph P. Bonk, Des Plaines, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Jul. 27, 1978, Ser. No. 928,758

Term of patent 14 years

Int. Cl. D24—*02, 04*

U.S. Cl. D24—63



253,375

SAFETY RAZOR CARTRIDGE WITH CLEAN-OUT MECHANISM

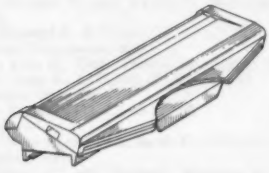
Evan N. Chen, Fairfield, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 30, 1977, Ser. No. 866,142

Term of patent 14 years

Int. Cl. D28—*03*

U.S. Cl. D28—43



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF NOVEMBER, 1979

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-T-O Inc.: *See*—
Dillard, Winford, 4,173,370, Cl. 296-65.00A.

AB Transporteknik: *See*—
Von Knorring, Knut A., 4,173,272, Cl. 194-9.00T.

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Abbott Laboratories: *See*—
Muetterties, Andrew J., 4,173,222, Cl. 128-214.00C.
Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, 4,173,564, Cl. 260-112.50R.

Abe, Masahiro; Eifuku, Yoshiaki; and Kajiwara, Toshio, to Hitachi, Ltd.; and Nippon Telegraph and Telephone Public Corporation. Communication control system. 4,173,790, Cl. 364-900.000.

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Janecek, Jaroslav; and Jiruse, Jaroslav, 4,173,335, Cl. 271-93.000.

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Adee, Raymond A., to Hesston Corporation. Disc gang mounting. 4,173,262, Cl. 172-599.000.

Adolph, Horst G.: *See*—
Koppes, William M.; Adolph, Horst G.; and Sitzmann, Michael E., 4,173,591, Cl. 260-646.000.

Adolphen, Gerhard: *See*—
Steinacker, Karl-Heinz; and Adolphen, Gerhard, 4,173,581, Cl. 260-552.0SC.

Agency of Industrial Science and Technology: *See*—
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,460, Cl. 65-40.000.
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,461, Cl. 65-106.000.

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Massengeil, Hans A.; Stemme, Otto; Eppe, Rudolf; Pfeifer, Josef; Konigl, Georg; and Schatz, Anton, 4,173,411, Cl. 355-50.000.
Ranz, Erwin; Lohmann, Joachim W.; and Schutz, Heinz-Dieter, 4,173,479, Cl. 430-507.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Ohmi, Atsushi, 4,173,172, Cl. 91-369.00A.

Ajax Machine and Welding Co.: *See*—
Casad, Edward F.; Casad, Thomas R.; and Jones, Richard E., 4,173,196, Cl. 114-253.000.

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Ashida, Takeshi; Saito, Fumitaka; and Akamatsu, Masateru, 4,173,669, Cl. 428-35.000.

Akao, Akimasa: *See*—
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,460, Cl. 65-40.000.
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,461, Cl. 65-106.000.

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Akazawa, Hiroyuki, to Kabushiki Kaisha Suwa Seikosha; and Shinshu Seiki Kabushiki Kaisha. Line printer character belt. 4,173,183, Cl. 101-111.000.

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Noomen, Arie; van der Geest, Johannes M. P.; de Jong, Cornelis; and Van Santen, Dick, 4,173,682, Cl. 428-423.000.

Akzona Incorporated: *See*—
Brandeau, Edward P., 4,173,388, Cl. 339-276.00T.
Bruins, Antonius H. N. M.; and Vollema, Gerlof, 4,173,652, Cl. 424-324.000.

Alco Foodservice Equipment Company: *See*—
Marshall, William A., 4,173,296, Cl. 222-129.100.

Aldridge, Clifton; Gibson, Sandra F.; Vannest, Richard D.; and Rodgers, Gregory D., to McDonnell Douglas Corporation. Group D enterococci broth. 4,173,515, Cl. 435-38.000.

Alfio, Deregibus, to Goodyear Tire & Rubber Company, The. Equipment for producing continuous tapes of rubbery vulcanizable material, for the manufacture of hose articles. 4,173,444, Cl. 425-363.000.

Allbert, Barrie J.: *See*—
Wilde, Ralph; and Allbert, Barrie J., 4,173,243, Cl. 152-158.000.

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Holtz, John W., 4,173,618, Cl. 423-58.000.
Minhas, Pritam S.; and Sukornick, Bernard, 4,173,671, Cl. 428-85.000.
Palmer, Louis R.; and Karo, James T., 4,173,708, Cl. 562-460.000.

Allied Energy Corporation: *See*—
Schrank, Jerome, 4,173,450, Cl. 431-190.000.

Allis-Chalmers Corporation: *See*—
Heckenkamp, Edward B., 4,173,259, Cl. 172-10.000.
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Allmark, Reginald H.; and Bottoms, Norman, to International Computers Limited. Electrical connectors. 4,173,381, Cl. 339-17.0LM.

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Smith, Thomas J., 4,173,457, Cl. 51-309.000.

Alouche, Antoine R.: *See*—
Cruthers, Larry R.; James, Terrence M.; Goff, Sidney; and Alouche, Antoine R., 4,173,632, Cl. 424-232.000.

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Shell, John W., 4,173,226, Cl. 128-233.000.

AM International, Inc.: *See*—
Beck, Charles K., 4,173,558, Cl. 260-33.40R.
Beck, Charles K., 4,173,559, Cl. 260-33.40R.

American Antenna Corporation: *See*—
Liautaud, James P., 4,173,761, Cl. 343-715.000.

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Hanifin, John W., Jr.; and Ridge, David N., 4,173,650, Cl. 424-304.000.

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Newman, Howard F., 4,173,225, Cl. 128-218.00C.

American Optical Corporation: *See*—
Rotenberg, Don H.; Cuffe, Patricia M.; Laurin, Bernard L.; and Ramirez, Peter R., 4,173,490, Cl. 106-287.140.

American Standard, Inc.: *See*—
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Steiner, Charles D.; and Sucheski, Matthew M., 4,173,067, Cl. 29-749.000.
Zell, Dale R., 4,173,387, Cl. 339-196.00M.

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Anderson, Larry W., to Westinghouse Electric Corp. Dynamic brake current limiting control apparatus and method. 4,173,732, Cl. 318-375.000.

Anderson, Wilbert C.: *See*—
Thompson, Vernal W.; and Anderson, Wilbert C., 4,173,762, Cl. 343-759.000.

Ando, Masumi, to Hukuba Kogyo Kabushiki Kaisha. Floor sweeper. 4,173,054, Cl. 15-98.000.

Andrews, Harry N.: *See*—
Massaro, Anthony A., Jr.; and Andrews, Harry N., 4,173,060, Cl. 29-157.400.

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Greenberg, Jacob; and Robertson, John E., 4,173,190, Cl. 110-243.000.

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Van Steenwyk, Donald H.; and Childress, Ira N., 4,173,228, Cl. 128-653.000.

Arakawa, Tatsumi: *See*—
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Arbrook, Inc.: *See*—
Law, David C. F., 4,173,653, Cl. 424-333.000.

Arends, Albert W.; and Pickard, George L., to Leesona Corporation. Trim press. 4,173,161, Cl. 83-278.000.

Argus Chemical Corporation: *See—*
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,173,599, Cl. 525-66.000.

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Conn, Don L., 4,173,139, Cl. 73-1.0DV.

Arntsen, Arnt P., to RCA Corporation. Coupling a frequency modulated signal to a tuned load. 4,173,743, Cl. 333-32.000.

Arthur, Richard P., to Sunbeam Corporation. Cooking assembly. 4,173,179, Cl. 99-374.000.

Asahi-Dow Limited: *See—*
Ashida, Takeshi; Saito, Fumitaka; and Akamatsu, Masateru, 4,173,669, Cl. 428-35.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
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Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Kobayashi, Koichi, 4,173,395, Cl. 350-214.000.
Okamoto, Ikuzo; and Shindo, Osamu, 4,173,398, Cl. 351-9.000.

Asai, Kiyokazu; and Takeuchi, Akihiro, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Piezoelectrically driven ultrasonic transducer. 4,173,725, Cl. 310-325.000.

Asakura, Hiroshi; Chimura, Ippei; Kitazume, Keisuke; Kaneko, Yoshiyuki; Fuse, Shirou; and Ueno, Akio, to Toyo Kagaku Kabushiki Kaisha. Adhesive tape. 4,173,676, Cl. 428-332.000.

Asami, Kazuto; and Okamoto, Takashi, to Glory Kogyo Kabushiki Kaisha. Residual coin detecting device in coin processing machine. 4,173,232, Cl. 133-3.00R.

Aschiero, Roland: *See—*
Sundt, Erling; and Aschiero, Roland, 4,173,550, Cl. 252-522.000.

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Kollberg, Sten; and Tiberg, Lars, 4,173,299, Cl. 222-594.000.

Ashida, Takeshi; Saito, Fumitaka; and Akamatsu, Masateru, to Asahi-Dow Limited. Aqueous dispersion for coating and coated articles. 4,173,669, Cl. 428-35.000.

Atlow Mining Development Consultants Limited: *See—*
Dawson, Gordon B., 4,173,280, Cl. 198-812.000.

Atmospheric Sciences, Inc.: *See—*
Laliotis, Theodore A., 4,173,788, Cl. 364-560.000.

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Borg, Patrick, 4,173,699, Cl. 526-237.000.

Au, Andrew T.; and Freedman, Harold H., to Dow Chemical Company, The. Polymer-supported poly(alkyleneglycol ethers). 4,173,693, Cl. 525-329.000.

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Izumi, John; and D'Orio, Angelo, 4,173,055, Cl. 15-250.020.

AVSP, Inc.: *See—*
Stansbury, Benjamin H., Jr.; and Fluster, Barry, 4,173,282, Cl. 206-216.000.

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Hennes, John H.; and Crecente, Christopher P., 4,173,678, Cl. 428-364.000.
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Willcox, Kenneth W.; and Bailey, Fay W., 4,173,597, Cl. 525-98.000.

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Baker, Mickey C.: *See—*
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Baker, Ralph L.: *See—*
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Baker, Richard L., to High Standard, Inc. Cylinder-locking device for revolvers. 4,173,090, Cl. 42-67.000.

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Elliehausen, Heinrich; Hohenschutz, Heinz; Strohmeyer, Max; and Haug, Juergen, 4,173,589, Cl. 260-604.0HF.
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Enders, Edgar; Ebbighausen, Volker; Gau, Wolfgang; Wunsche, Christian; and Stendel, Wilhelm, 4,173,645, Cl. 424-273.00R.
Findeisen, Kurt; Wagner, Kuno; and Uerdingen, Walter, 4,173,567, Cl. 548-216.000.
Rademachers, Jakob; and Linde, Gunter, 4,173,624, Cl. 423-551.000.
Schmitz, Reinold; and Wunderlich, Klaus, 4,173,568, Cl. 260-314.500.
Steinacker, Karl-Heinz; and Adolphen, Gerhard, 4,173,581, Cl. 260-552.0SC.
Woditsch, Peter; Winter, Gerhard; Linde, Gunter; and Muller, Friedhelm, 4,173,485, Cl. 106-73.300.

Bayerische Motoren Werke Aktiengesellschaft: *See—*
Vinko, Michael; and Schmid, Dieter, 4,173,174, Cl. 98-2.040.

BBC Brown Boveri & Company Limited: *See—*
Hausler, Michael; and Kanngiesser, Karl-Werner, 4,173,780, Cl. 363-51.000.
Osman, Maged A., 4,173,544, Cl. 252-299.000.

Beall, Leman G., Jr.: *See—*
Shipman, James J.; Hallman, Robert W.; Tenney, Linwood P.; and Beall, Leman G., Jr., 4,173,503, Cl. 156-123.00R.

Beals, Jeffrey R.: *See—*
Yates, Patrick; Woodcock, Sydney H.; and Beals, Jeffrey R., 4,173,169, Cl. 89-132.000.

Beck, Charles K., to AM International, Inc. Non-aqueous polymeric dispersion alkyl methacrylate copolymers in mixtures of organic solvents and glossy coatings produced therefrom. 4,173,558, Cl. 260-33.40R.

Beck, Charles K., to AM International, Inc. Non-aqueous polymeric dispersion of alkyl methacrylate and alkyl acrylate copolymers in mixtures of cyclohexane and alcohols and matte coatings produced therefrom. 4,173,559, Cl. 260-33.40R.

Beguin, Alain; Dubois, Jean-Claude; and Zann, Annie, to Thomson-CSF. Liquid crystal with high negative dielectric anisotropy and mixtures of the same with nematic liquid crystals for improving dynamic scattering in electro-optic devices. 4,173,545, Cl. 252-299.000.

Bell, Antony G., to Fairchild Camera and Instrument Corporation. Insulated gate field-effect transistor read-only memory array. 4,173,791, Cl. 365-182.000.

Bell Telephone Laboratories, Incorporated: *See—*
Chandross, Edwin A.; and Tomlinson, Walter J., III, 4,173,475, Cl. 430-290.000.
Curtis, Lyn, 4,173,389, Cl. 350-96.200.
Fahrenholtz, Susan; Long, David T.; and Pitetti, Raymond C., 4,173,470, Cl. 430-5.000.

Bendix Corporation, The: *See—*
Gongwer, Calvin A., 4,173,195, Cl. 114-244.000.
Toelle, Alvin D., 4,173,205, Cl. 123-119.00A.

Beneteau, Donald J. Knock-down press. 4,173,181, Cl. 100-231.000.

Benke, Frank W.: *See—*
Stubblefield, Thomas W.; and Benke, Frank W., 4,173,746, Cl. 336-57.000.

Bensoam, Jean: *See—*
Mathey, Francois; and Bensoam, Jean, 4,173,706, Cl. 560-30.000.

Benson, Nigel C.; Hughes, John M. F.; Kingslake, Denis; and Symonds, David G., to Imperial Chemical Industries Limited. Process for feeding a moving web to a stenter apparatus. 4,173,611, Cl. 264-138.000.

Benson, Ronald J.: *See—*
Hicks, Patrick C.; Benson, Ronald J.; and Roberts, Howard M., 4,173,168, Cl. 84-470.00R.

Beppu, Yositugu: *See—*
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,173,688, Cl. 521-56.000.

Bergman, Lawrence A.; and Gorndt, John H., to Lord Corporation. Flexible sealing joint. 4,173,360, Cl. 285-51.000.

Berringer, Robert T.: *See—*
Obermeyer, Franklin D.; and Berringer, Robert T., 4,173,513, Cl. 176-50.000.

Berwick, Martin A.; and Riecke, Edgar E., to Eastman Kodak Company. Polyester interlayer and binder component in multilayer photoconductive element. 4,173,472, Cl. 430-60.000.

Bethany Fellowship, Inc.: *See—*
Thornberg, John H., 4,173,428, Cl. 414-766.000.

Betz, Jacob F.: *See—*
Schmidt, Ferenc J.; and Betz, Jacob F., 4,173,497, Cl. 136-89.0SJ.

Beuch, Wallace E.; and Zell, Michael N., to International Business Machines Corporation. Gripping device for magnetic diskettes. 4,173,427, Cl. 414-751.000.

BFG Glassgroup: *See*—
Hentzelt, Walther E.; Nolte, Hans-Henning; and von Reis, Wolf, 4,173,668, Cl. 428-34.000.

Big Jon, Inc.: *See*—
Emory, John E., Jr., 4,173,091, Cl. 43-43.120.

Bille, Heinz, to Maschinenfabrik Walter Scheele KG. Pivotable pipe slide for use in a two cylinder concrete pump. 4,173,436, Cl. 417-516.000.

Billings Energy Corporation: *See*—
Billings, Roger E., 4,173,625, Cl. 423-648.00R.

Billings, Roger E., to Billings Energy Corporation. Hydrogen purification and storage system. 4,173,625, Cl. 423-648.00R.

Biotronik Mess- und Therapiegerate GmbH & Co.: *See*—
Digby, Dennis, 4,173,230, Cl. 128-419.0PG.

Bird, Harry L.; and Sutherland, David T., to Virtis Company, Inc., The. Shelf arrangement for freeze drying apparatus. 4,173,078, Cl. 34-92.000.

Birke, Walter; von der Eltz, Hans-Ulrich; and Schon, Franz, to Hoechst Aktiengesellschaft. Process and additional devices of drying machines for the uniform drying of textiles. 4,173,077, Cl. 34-23.000.

Black, Lenoir: *See*—
Kuceski, Vincent P.; and Black, Lenoir, 4,173,552, Cl. 260-23.70M.

Blake, Charles R.: *See*—
Sugalski, Raymond K.; and Blake, Charles R., 4,173,733, Cl. 320-48.000.

Blankenship, Michael G., to Corning Glass Works. System for delivering materials to deposition site on optical waveguide blank. 4,173,305, Cl. 239-79.000.

Bloch, Alan; Coviello, Frank A.; Guzik, Ira; and Puebla, Candido, to TIE/Communications, Inc. Communication circuit with combined power feed and data transmission over a phantom channel. 4,173,714, Cl. 179-99.00R.

Blok, Arie. Rotary mixer. 4,173,419, Cl. 366-228.000.

Boehringer Ingelheim GmbH: *See*—
Maier, Roland; Woitun, Eberhard; Reuter, Wolfgang; Wetzel, Bernd; Goeth, Hanns; and Lechner, Uwe, 4,173,647, Cl. 424-283.000.

Boling, Norman L.; and Dube, George, to Owens-Illinois, Inc. Solid state laser amplifier having two output wavelengths. 4,173,738, Cl. 330-4.300.

Boling, Norman L.: *See*—
Rapp, Charles F.; and Boling, Norman L., 4,173,495, Cl. 136-89.0PC.

Bom, Cornelis J. G.: *See*—
van der Lely, Ary; and Bom, Cornelis J. G., 4,173,260, Cl. 172-59.000.

Bonnety, Gerard: *See*—
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,173,710, Cl. 568-614.000.

Booty, Donald J. Portable track lighting. 4,173,382, Cl. 339-22.00B.

Borg, Patrick, to Ato Chimie. Process for manufacturing petroleum resins for adhesive thermofusible compositions. 4,173,699, Cl. 526-237.000.

Bostroem, Theodore. Dipless metallizing process and apparatus. 4,173,663, Cl. 427-211.000.

Bottoms, Norman: *See*—
Allmark, Reginald H.; and Bottoms, Norman, 4,173,381, Cl. 339-17.0LM.

Boulais, Marcel J.; and Boulais, Richard A. Laser beam level control with automatic override. 4,173,258, Cl. 172-4.500.

Boulais, Richard A.: *See*—
Boulais, Marcel J.; and Boulais, Richard A., 4,173,258, Cl. 172-4.500.

Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, to Solvay & Cie. Halogenated polyether polyols and polyurethane foams produced therefrom. 4,173,710, Cl. 568-614.000.

Bourdon, Bernard, to Alsthom-Atlantique. Method for depositing thin layers of materials by decomposing a gas to yield a plasma. 4,173,661, Cl. 427-39.000.

Boyce, Oren D. Lumber cutting attachments for chain saws. 4,173,240, Cl. 144-312.000.

Bozarth, Gene A.: *See*—
Peterson, Larry W.; Bozarth, Gene A.; and Pilgram, Kurt H. G., 4,173,463, Cl. 71-87.000.

Bradbury, John R., to Ethyl Development Corporation. Apparatus for contact cooling the neck moil of blown hollow containers. 4,173,447, Cl. 425-526.000.

Bradshaw, Norman F., to Schweitzer Industrial Corporation. Energy recovery system. 4,173,125, Cl. 62-79.000.

Bradshaw, Stephen L.: *See*—
Unsworth, William; King, John F.; and Bradshaw, Stephen L., 4,173,469, Cl. 75-168.00F.

Brandeau, Edward P., to Akzona Incorporated. Connector-cable with crimped electrical terminations. 4,173,388, Cl. 339-276.00T.

Brannegan, Daniel P.: *See*—
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,173,572, Cl. 260-345.90R.

Bratt, Martin D.; and Cohen, Abraham B., to Du Pont de Nemours, E. I., and Company. Dot-etchable masks from photopolymerizable elements. 4,173,673, Cl. 428-217.000.

Brennan, Michael P. J., to Chloride Silent Power Limited. Sodium sulphur cells. 4,173,686, Cl. 429-104.000.

Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., to Pfizer Inc. Preparation of gamma-pyrones from 3-substituted furans. 4,173,572, Cl. 260-345.90R.

Brenner, Douglas; and Oswald, Alexis A., to Exxon Research & Engineering Co. Alkyl ammonium ionomers. 4,173,695, Cl. 526-332.000.

Brown, Michael J., to GAF Corporation. Phenoxybenzylphosphonium salt herbicides and plant growth regulants. 4,173,462, Cl. 71-86.000.

Brown, Thomas H.; Durant, Graham J.; Ganellin, Charon R.; and Ife, Robert J., to Smith Kline & French Laboratories Limited. Thiourea compounds, compositions and methods and use. 4,173,644, Cl. 424-270.000.

Brownawell, Darrell W.: *See*—
Lonstrup, Thor F.; Brownawell, Darrell W.; and Howlett, Barry J., 4,173,540, Cl. 252-49.600.

Browning, James T.: *See*—
Mortensen, Donald G.; and Browning, James T., 4,173,257, Cl. 171-33.000.

Brudi Equipment, Inc.: *See*—
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Bruins, Antonius H. N. M.; and Vollema, Gerlof, to Akzona Incorporated. Pharmaceutical hydroxamic acid compositions and uses thereof. 4,173,652, Cl. 424-324.000.

Brussel, Richard: *See*—
Pfeiffer, Heinrich; and Brussel, Richard, 4,173,275, Cl. 198-421.000.

Bryant Manufacturing Pty. Limited: *See*—
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Bryant, Michael D.: *See*—
McLaughlin, John R.; Bryant, Michael D.; Fessel, Manfred; and Taylor, Kenneth C., 4,173,466, Cl. 75-58.000.

Bryant, Stanley, to Bryant Manufacturing Pty. Limited. Stop lamp monitor circuit. 4,173,751, Cl. 340-80.000.

Bunker Ramo Corporation: *See*—
Fenn, John W.; and Stokes, James R., 4,173,385, Cl. 339-177.00E.

Bureau, Jean Y.; and Charlebois, Bernard, to Mscan Metal Canada Limitee. Apparatus for steaming foods. 4,173,215, Cl. 126-369.000.

Burgoon, Jack L.; and Knowlton, Christopher M., to Scott & Fetzer Company, The. Riding sweeper. 4,173,052, Cl. 15-83.000.

Butler, George N. Battery-operated body capacitance intrusion alarm apparatus. 4,173,755, Cl. 340-562.000.

C. P. Hall Company, The: *See*—
Kuceski, Vincent P.; and Black, Lenoir, 4,173,552, Cl. 260-23.70M.

Cabot Corporation: *See*—
Rosof, Barry H., 4,173,467, Cl. 75-119.000.

California Institute of Technology: *See*—
Scherer, Kirby V., 4,173,654, Cl. 424-350.000.

Camardella, Giuseppe. Numerically controlled coil winding machine. 4,173,312, Cl. 242-7.110.

Campbell, John A. L.; and Moynihan, Daniel J., to Peabody Coal Company, Inc. Advance method and apparatus for mining. 4,173,373, Cl. 299-11.000.

Campisusa S.P.A.: *See*—
Nesti, Gian P., 4,173,289, Cl. 220-7.000.

Canon Kabushiki Kaisha: *See*—
Hanakata, Takayoshi, 4,173,273, Cl. 400-120.000.
Tanaka, Takashi; and Nishide, Katsuhiko, 4,173,474, Cl. 430-1.000.

Capo, James L., to International Paper Company. Poultry tray. 4,173,655, Cl. 426-129.000.

Carbajal, Bernard G.: *See*—
Chiang, Shang-Yi; and Carbajal, Bernard G., 4,173,496, Cl. 136-89.0MS.

Cargill, Bobby L. Bolster-actuated lockback knife. 4,173,068, Cl. 30-161.000.

Carl Schleicher & Schull: *See*—
Hein, Wolfgang, 4,173,364, Cl. 292-256.670.

Carlock, John T., to Continental Oil Company. Polymer bound (pentahaptocyclopentadienyl) bis carbonyl rhodium hydroformylation catalyst. 4,173,575, Cl. 260-429.00R.

Carrier Corporation: *See*—
Whitehead, James S.; and Lawson, Thomas M., 4,173,424, Cl. 414-517.000.

Cartes, Juan B.: *See*—
Jarque, Ricardo G.; Cartes, Juan B.; Jimenez, Rosa L.; Roldan, Cristobal M.; and Peinado, Fernando R., 4,173,705, Cl. 546-283.000.

Caruso, Anthony M. Toy gun of the revolver type and laminar ammunition therefor. 4,173,088, Cl. 42-58.000.

Cary Metal Products, Inc.: *See*—
Curran, Thomas F.; Tafel, Leonard I.; Engert, Caspar F.; and LaBarre, Robert E., 4,173,314, Cl. 242-58.400.

Casad, Edward F.; Casad, Thomas R.; and Jones, Richard E., to Ajax Machine and Welding Co. Safety release for water skiing tow line. 4,173,196, Cl. 114-253.000.

Casad, Thomas R.: *See*—
Casad, Edward F.; Casad, Thomas R.; and Jones, Richard E., 4,173,196, Cl. 114-253.000.

Cassou, Bertrand M. E.: *See*—
Cassou, Robert E. J.; and Cassou, Bertrand M. E., 4,173,227, Cl. 128-235.000.

Cassou, Robert E. J.; and Cassou, Bertrand M. E. Injecting gun for animals, in particular for the artificial insemination of cattle. 4,173,227, Cl. 128-235.000.

Castelazo, Garbiel G. M.; Quintero, Abraham; Medina, Alejandro; and Fabila, Gilberto. Polymeric compositions and methods for their production. 4,173,598, Cl. 428-402.000.

Caterpillar Tractor Co.: *See—*
Durham, Donald F., 4,173,129, Cl. 64-17.00A.
CBS, Inc.: *See—*
Stanley, Donald E., 4,173,167, Cl. 84-345.000.
CDC Research Inc.: *See—*
Shiah, Chyn-Duog, 4,173,453, Cl. 8-10.100.
Celanese Corporation: *See—*
Lin, Victor J., 4,173,443, Cl. 425-66.000.
Cencier, Lucien, to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull. System of coherent management of exchanges between two contiguous levels of a hierarchy of memories. 4,173,781, Cl. 364-200.000.
Central Glass Company, Limited: *See—*
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,460, Cl. 65-40.000.
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,461, Cl. 65-106.000.
Ceskoslovenska akademie ved.: *See—*
Stoy, Vladimir; Stoy, Artur; Zima, Jiri; and Kalal, Jaroslav, 4,173,606, Cl. 264-1.000.
Chabala, John C.; Fisher, Michael H.; and Mrozik, Helmut H., to Merck & Co., Inc. 13-Halo and 13-deoxy derivatives of C-076 compounds. 4,173,571, Cl. 260-343.410.
Chambley, Phillip W.; and Norris, Alan H., to WWG Industries, Inc. Yarn forming apparatus with node welding. 4,173,115, Cl. 57-293.000.
Champion International Corporation: *See—*
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Chandross, Edwin A.; and Tomlinson, Walter J., III, to Bell Telephone Laboratories, Incorporated. Latent image thick refractive index recordings. 4,173,475, Cl. 430-290.000.
Chang, Leroy L.; and Esaki, Leo, to International Business Machines Corporation. Heterojunction tunneling base transistor. 4,173,763, Cl. 357-12.000.
Chang, Wei: *See—*
Gold, Elijah H.; and Chang, Wei, 4,173,583, Cl. 260-559.00S.
Chao, Albert: *See—*
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Chao, Ethel; and Chao, Albert. Illuminated collar for pets and the like. 4,173,201, Cl. 119-106.000.
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Dixon, Thomas E.; and Chapman, Jerry L., 4,173,425, Cl. 414-667.000.
Charlebois, Bernard: *See—*
Bureau, Jean Y.; and Charlebois, Bernard, 4,173,215, Cl. 126-369.000.
Chatani, Ikuo, to Sony Corporation. Speaker cabinet. 4,173,267, Cl. 181-199.000.
Cheetham, Colin J.; and Maguire, Phillip, to Pilkington Brothers Limited. Coating of glass fibres. 4,173,486, Cl. 106-99.000.
Chemap AG: *See—*
Katinger, Hermann; and Scheirer, Winfried, 4,173,516, Cl. 435-286.000.
Chemetals Corporation: *See—*
Welsh, Jay Y.; and Sochol, Irving, 4,173,617, Cl. 423-34.000.
Chemische Werke Huels Aktiengesellschaft: *See—*
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Chemplex Company: *See—*
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Chen, Joseph L. P., to Hooker Chemicals & Plastics Corp. Method for the manufacture of dialkyl dithiophosphoric acid and dialkyl phosphorochloridothionate. 4,173,603, Cl. 260-986.000.
Cheung, Derek T.: *See—*
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Chiang, Shang-Yi; and Carbajal, Bernard G., to Texas Instruments Incorporated. Integrated solar cell array. 4,173,496, Cl. 136-89.0MS.
Chicago Bridge & Iron Company: *See—*
Reiche, Robert F., 4,173,239, Cl. 144-311.000.
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Chimura, Ippei: *See—*
Asakura, Hiroshi; Chimura, Ippei; Kitazume, Keisuke; Kaneko, Yoshiyuki; Fuse, Shirou; and Ueno, Akio, 4,173,676, Cl. 428-332.000.
Chisso Corporation: *See—*
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Chloride Silent Power Limited: *See—*
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Chlorine Engineers Corp., Ltd.: *See—*
Nakamatsu, Shuji; Harada, Hiroyuki; Shinomiya, Yoshitugu; and Omizu, Tuyoshi, 4,173,525, Cl. 204-275.000.
Chou, Hsu Ching. Input system for sino-computer. 4,173,753, Cl. 340-146.30R.
Chromalloy American Corporation: *See—*
Eglinton, Robert B.; and Tuell, James L., 4,173,108, Cl. 53-587.000.
Mal, M. Kumar; and Tarkan, Stuart E., 4,173,471, Cl. 75-237.000.
Ciba-Geigy Corporation: *See—*
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Sallmann, Alfred; and Pfister, Rudolf, 4,173,577, Cl. 260-500.50H.
Cieloszyk, Gary S., to Union Carbide Corporation. Parylene stabilization. 4,173,664, Cl. 427-385.00R.
Cincinnati Electronics Corporation: *See—*
Schmit, David E.; and Richmond, Jon C., 4,173,777, Cl. 362-253.000.
Cincinnati Milacron Chemicals Inc.: *See—*
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Cincinnati Milacron Inc.: *See—*
Kuhnell, Thomas J.; Tanner, Randall C.; and Dryak, Alois V., 4,173,786, Cl. 364-475.000.
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Takahashi, Kazutoshi; Nitta, Tatsuo; and Iwakura, Ryoji, 4,173,117, Cl. 58-85.500.
Clark Equipment Company: *See—*
Craig, George A., 4,173,269, Cl. 188-71.500.
Hildebrandt, Jack A.; Pointer, Denver K.; and Stilley, Herschel H., 4,173,501, Cl. 148-16.500.
Lease, Robert D., 4,173,298, Cl. 222-368.000.
Clatworthy, Gordon K.; and Ward, Edwin. Navigation instrument. 4,173,413, Cl. 356-145.000.
Clausser, Karl C. Universal 35mm film cartridge for rewind and no-rewind operation. 4,173,315, Cl. 242-74.000.
Clave, Marcel: *See—*
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Clave, Serge; and Clave, Marcel. Prism combination periscope. 4,173,394, Cl. 350-181.000.
Cleare, Peter J. V., to Imperial Chemical Industries Limited. Preparation of halogenated aldehydes. 4,173,570, Cl. 260-340.90R.
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Cline-Buckner, Inc.: *See—*
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Close, Ross A. Police firearm. 4,173,170, Cl. 89-188.000.
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Cohen, Abraham B.: *See—*
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Cohen, Sidney M., to Fuller Company. Process for treating cement plant dust catch. 4,173,487, Cl. 106-103.000.
Colgate-Palmolive Company: *See—*
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Combustion Engineering, Inc.: *See—*
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Dietrich, Joseph R.; Flinn, William S.; and Groves, Malcolm D., 4,173,511, Cl. 176-36.00R.
Comizzoli, Robert B., to RCA Corporation. Chemically treating the overcoat of a semiconductor device. 4,173,683, Cl. 428-447.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Libis, Fernand, 4,173,440, Cl. 418-84.000.
Compagnie Internationale pour l'Informatique Cii-Honeywell Bull: *See—*
Cencier, Lucien, 4,173,781, Cl. 364-200.000.
Condon, Michael E.: *See—*
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Conn, Don L., to Armco Steel Corporation. Ultrasonic reference standard and the methods of construction and use thereof. 4,173,139, Cl. 73-1.0DV.
Conti, Ronald S.: *See—*
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Continental Oil Company: *See—*
Carlock, John T., 4,173,575, Cl. 260-429.00R.
Cooper, Thomas H., to Combustion Engineering, Inc. Boiler cold start using pulverized coal in ignitor burners. 4,173,189, Cl. 110-106.000.
Copal Company Limited: *See—*
Okabe, Katsuhiko, 4,173,420, Cl. 400-618.000.
Copp, Queve E. Vending machine for fabric-like articles and method. 4,173,271, Cl. 194-4.00C.
Coran, Aubert Y.; and Patel, Raman P., to Monsanto Company. Elastoplastic compositions of rubber and polyamide. 4,173,556, Cl. 260-30.80R.
Corkhill, David P., to Standard Oil Company (Indiana). Digital drive and phase-lock for seismic vibrators. 4,173,749, Cl. 367-190.000.
Cornelis van der Lely N.V.: *See—*
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Corning Glass Works: *See—*
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Locke, Gerald M., 4,173,062, Cl. 29-570.000.
Maurer, Robert D., 4,173,393, Cl. 350-96.340.
Cortez, Pedro J. Animated painting. 4,173,085, Cl. 40-433.000.
Corvelli, Nicholas, to Grumman Aerospace Corporation. Composite drive shaft. 4,173,128, Cl. 64-1.00S.
Cotton, John M.: *See—*
Giesken, Kenneth F.; and Cotton, John M., 4,173,713, Cl. 179-18.0EA.
Couleur, John F.; and Scriver, Robert E., to Honeywell Information Systems, Inc. Method of accessing paged memory by an input-output unit. 4,173,783, Cl. 364-200.000.
Coulter Information Systems, Inc.: *See—*
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Coutin, Pierre F.: *See—*
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Coviello, Frank A.: *See—*
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Craig, George A., to Clark Equipment Company. Wet brake or clutch. 4,173,269, Cl. 188-71.500.
Crawford, Tom H., Jr. Pellet gun loading device. 4,173,211, Cl. 124-45.000.
Crawford, Wheeler C.; and wilson, James R., to Texaco Inc. Asphalt mineral aggregate compositions. 4,173,489, Cl. 106-281.00N.
Crecente, Christopher P.: *See—*
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Crise, George W. Internal combustion engine having automatic compression control. 4,173,202, Cl. 123-48.00B.
Critten, Donald L.; and Bardwell, Charles E., to George Kent Limited. Differential pressure sensing devices. 4,173,149, Cl. 73-706.000.
Crivello, James V., to General Electric Company. Heat curable compositions. 4,173,551, Cl. 260-18.0EP.
Crompton, Violet. Peg game apparatus. 4,173,339, Cl. 273-95.00R.
Cronin, Penny S. Gloved splint for an arthritic hand. 4,173,218, Cl. 128-77.000.
Crosfield Electronics Limited: *See—*
Pugsley, Peter C.; and Perriman, Michael J., 4,173,416, Cl. 356-432.000.
Croswhite, Howard L.; Gregg, James H.; and Guido, Angelo L., to Ford Motor Company. Hydrokinetic torque converter with a direct drive lock-up clutch adapted for one-way torque delivery. 4,173,270, Cl. 192-3.290.
Cruff, Carlton E.; and Harrison, William E., to United Technologies Corporation. Method and apparatus for drying investment casting molds. 4,173,079, Cl. 34-217.000.
Cruthers, Larry R.; James, Terrence M.; Goff, Sidney; and Alouche, Antoine R., to E. R. Squibb & Sons, Inc. Fasciolicidal compositions. 4,173,632, Cl. 424-232.000.
Cubic Corporation: *See—*
Bakhru, Keshoolal, 4,173,759, Cl. 343-100.0LE.
Cuffe, Patricia M.: *See—*
Rotenberg, Don H.; Cuffe, Patricia M.; Laurin, Bernard L.; and Ramirez, Peter R., 4,173,490, Cl. 106-287.140.
Curran, Thomas F.; Tafel, Leonard I.; Engert, Caspar F.; and LaBarre, Robert E., to Cary Metal Products, Inc. Continuous web supply apparatus. 4,173,314, Cl. 242-58.400.
Curtis, Lyn, to Bell Telephone Laboratories, Incorporated. Molded optical fiber connector. 4,173,389, Cl. 350-96.200.
Cushman, David W.: *See—*
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Cyphelly, Ivan J. Hydraulic push drive for pusher centrifuges. 4,173,303, Cl. 233-24.000.
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Dastur, Khurshid P., to Firmenich SA. Novel cyclopentanone derivatives as flavor- and odor-modifying ingredients. 4,173,584, Cl. 260-586.00R.
Davis, Floyd O. Decorticator and separator for seed products. 4,173,177, Cl. 99-618.000.
Dawson, Gordon B., to Atlow Mining Development Consultants Limited. Apparatus for driving a mining machine into a driveway extending from a mining roadway. 4,173,280, Cl. 198-812.000.
Dawson, Harmel A.: *See—*
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De Corlieu-Ferran, Jeanne. Device for simulating a card game. 4,173,342, Cl. 273-148.00R.
de Cremoux, Baudouin, to Thomson-CSF. Field effect transistor on a support having a wide forbidden band. 4,173,764, Cl. 357-22.000.
Dejneka, Tamara: *See—*
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Demarthe, Jean-Michel; Gandon, Louis; and Goujet, Monique, to Societe Metallurgique le Nickel-S.L.N. Hydrometallurgical method for treating nickel mattes. 4,173,520, Cl. 204-113.000.
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Madrange nee Dermain, Annie; de Montalembert, Henri M.; Meurice, Pierre; and Refregier, Jean-Louis, 4,173,627, Cl. 424-47.000.
Dempski, Robert E.; Mehta, Gunvant N.; and Saboe, Joseph C., to Merck & Co., Inc. Sustained release indomethacin. 4,173,626, Cl. 424-19.000.
Denlinger, Edgar J.; and Veloric, Harold S., to RCA Corporation. Contact for semiconductor devices. 4,173,768, Cl. 357-68.000.
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Detering, Richard L., to Westinghouse Electric Corp. Digital pulse generator with end-stop detection and control. 4,173,722, Cl. 307-252.00Q.
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De Witt, Elmer J., to B. F. Goodrich Company, The. Soft-seeded toughening for polyvinyl chloride. 4,173,596, Cl. 428-402.000.
Dholakia, Anil R., to RCA Corporation. Grooved record playback system. 4,173,348, Cl. 274-47.000.
DiBattista, Dante P.: *See—*
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Dieter Haubold Industrielle Nagelgerate, Firma: *See—*
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Dietrich, Joseph R.; Flinn, William S.; and Groves, Malcolm D., to Combustion Engineering, Inc. Control rod blow out protection system. 4,173,511, Cl. 176-36.00R.
Digby, Dennis, to Biotronik Mess- und Therapiegerate GmbH & Co. Noise elimination and refractory period control in demand pacers. 4,173,230, Cl. 128-419.0PG.
Dillard, Winford, to A-T-O Inc. Mine vehicle with swivel seat. 4,173,370, Cl. 296-65.00A.
Dimacopoulos, Dimitrios A., to Cline-Buckner, Inc. Environmental control dispenser. 4,173,604, Cl. 261-30.000.
Dixon, Jerry D., to International Business Machines Corporation. Return and link mechanism. 4,173,782, Cl. 364-200.000.
Dixon, Thomas E.; and Chapman, Jerry L., to Brudi Equipment, Inc. Quick coupling for side shift cylinder of lift truck attachment. 4,173,425, Cl. 414-667.000.
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Doryokuro Kakunenryo Kaihatsu Jigyodan: *See—*
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Dow Chemical Company, The: *See—*
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Dow Corning Corporation: *See—*
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Dreyfuss, Michael M.; and Tscherter, Hans, to Sandoz Ltd. Antibiotic S 31794/F-1. 4,173,629, Cl. 424-118.000.
Drnevich, Raymond F.: *See—*
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Drori, Mordeki. Flow control devices particularly useful for drip irrigation. 4,173,309, Cl. 239-542.000.
Dryak, Alois V.: *See—*
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Dube, George: *See—*
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Dubois, Jean-Claude; and Delaunay, Alain, to Institut Francais du Petrole. Method for manufacturing sensitive elements having a permanent electric polarization. 4,173,659, Cl. 427-35.000.
Dubois, Jean-Claude: *See—*
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Duggins, Richard S. Means and method for aging liquor. 4,173,656, Cl. 426-422.000.
DuLondel, Jacques. Rotary speed limiter device. 4,173,332, Cl. 254-160.000.
Dunham, James V., to United States of America, Army. Ammunition. 4,173,186, Cl. 102-38.00R.
Dunlop Limited: *See—*
Wilde, Ralph; and Allbert, Barrie J., 4,173,243, Cl. 152-158.000.
Du Pont de Nemours, E. I., and Company: *See—*
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Bratt, Martin D.; and Cohen, Abraham B., 4,173,673, Cl. 428-217.000.
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Scheule, Harold J.; and Starn, Roy E., Jr., 4,173,456, Cl. 44-62.000.
Wolf, William E., 4,173,441, Cl. 356-431.000.
Dupree, Hans-Werner. Drawer assemblage. 4,173,380, Cl. 312-330.00R.
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Durant, Graham J.: *See—*
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Durbin, Damien E., to Honeywell Inc. Solvent wash system for a chromatographic analyzer. 4,173,145, Cl. 73-422.0GC.
Durham, Donald F., to Caterpillar Tractor Co. Universal joint structure with improved seal. 4,173,129, Cl. 64-17.00A.
Durrieu, Jean-Pierre; and Pomes, Guy, to Societe Abex Pagid Equipement S.A. Brake pad with integral organic backplate. 4,173,681, Cl. 428-409.000.
Dursch, Walter: *See—*
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Ondetti, Miquel A.; and Cushman, David W., 4,173,704, Cl. 548-336.000.
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Holstead, Colin; Kilminster, Kenneth N.; and Simons, Michael J., 4,173,478, Cl. 430-353.000.
Petropoulos, Constantine C.; Reynolds, George A.; and Van Allan, James A., 4,173,473, Cl. 430-72.000.
Swapceinski, John P.; Hilbert, Thomas K.; and McGlen, James A., 4,173,405, Cl. 355-3.0DD.
Vachon, Raymond N.; and McConnell, Richard L., 4,173,680, Cl. 428-375.000.
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, to Agency of Industrial Science and Technology; and Central Glass Company, Limited. Process for welding plate glasses together. 4,173,460, Cl. 65-40.000.
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, to Agency of Industrial Science and Technology; and Central Glass Company, Limited. Method of bending glass plate. 4,173,461, Cl. 65-106.000.
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Enders, Edgar; Ebbighausen, Volker; Gau, Wolfgang; Wunsche, Christian; and Stendel, Wilhelm, 4,173,645, Cl. 424-273.00R.
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Eickmann, Karl. Vehicle for traveling in the air and on the ground equipped with hydraulically driven propellers. 4,173,321, Cl. 244-17.230.
Eifuku, Yoshiaki: *See—*
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Ekinaka, Michael H.; and MacAnally, Richard B., to American Hospital Supply Corporation. Glass fiber light guide and method of making the same. 4,173,392, Cl. 350-96.260.
Eldridge, William J., to M&T Chemicals Inc. Method for preparing urethane-modified isocyanurate foams. 4,173,692, Cl. 521-125.000.
Electric Power Research Institute, Inc.: *See—*
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Elliehausen, Heinrich; Hohenschutz, Heinz; Strohmeyer, Max; and Haug, Juergen, to BASF Aktiengesellschaft. Purification of oxo aldehydes. 4,173,589, Cl. 260-604.0HF.
Emory, John E., Jr., to Big Jon, Inc. Down rigger line release. 4,173,091, Cl. 43-43.120.
Enders, Edgar; Ebbighausen, Volker; Gau, Wolfgang; Wunsche, Christian; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Substituted 4,5-dihydroxy-imidazolidine-2-thiones and their use as ectoparasiticides. 4,173,645, Cl. 424-273.00R.
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Engstrom, Carl B. A., to Euroc Development AB. Method of manufacturing building elements from so-called foamed ceramics. 4,173,609, Cl. 264-43.000.
Entenmann's, Inc.: *See—*
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Katona, Tibor; Kenderesy, Tamas; Nemes, Imre; Erdelyi, Agoston; and Ragalyi, Jozsef, 4,173,787, Cl. 364-550.000.
Erickson, Donald C. Combustion gas desulfurization. 4,173,619, Cl. 423-210.500.
Erker, James W.; and Schwehr, Richard A., to Towmotor Corporation. Expandable vehicle frame. 4,173,264, Cl. 180-68.500.
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Fahrenholtz, Susan; Long, David T.; and Pitetti, Raymond C., to Bell Telephone Laboratories, Incorporated. Novolak photoresist composition and preparation thereof. 4,173,470, Cl. 430-5.000.
Faillon, Georges; and Egloff, Guy, to Thomson-CSF. Impedance matched coupling device for microwave tubes. 4,173,744, Cl. 333-33.000.
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Fang, James C., to Du Pont de Nemours, E. I., and Company. Chloralkali cell diaphragm and its treatment. 4,173,526, Cl. 204-296.000.
Faramarzpour, Faramarz, to Polaroid Corporation. Photographic camera apparatus. 4,173,400, Cl. 354-27.000.
Farina, Carlo: *See—*
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Farnow, Stephen A., to Texas Instruments Incorporated. Split gate electrode, self-aligned antiblooming structure and method of making same. 4,173,064, Cl. 29-578.000.
Fassina, Cassiano, to Codama Holding S.A. Apparatus for reinforcing a fabric by applying a fluid reinforcing material thereto. 4,173,199, Cl. 118-212.000.
Fattor, Arthur P. Concentrating solar heat collector. 4,173,214, Cl. 126-441.000.
Fazzio, Frank J.: *See—*
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Feather Safety Razor Co., Ltd.: *See—*
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Feiker, George E., to General Electric Company. Distributed control system. 4,173,754, Cl. 340-310.00R.
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Fenn, John W.; and Stokes, James R., to Bunker Ramo Corporation. Watertight cable connector. 4,173,385, Cl. 339-177.00E.
Fenne, Ivor; and Jarrett, Boaz A., to Lucas Industries Limited. Fuel systems for an internal combustion engine. 4,173,208, Cl. 123-139.0AT.
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Fertl, Walter H., to Dresser Industries, Inc. Method for monitoring fluid movement behind casing in oil and gas wells. 4,173,718, Cl. 250-259.000.
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Fiedler, Howard C., to General Electric Company. Method of producing silicon-iron sheet material with boron addition, and product. 4,173,502, Cl. 148-113.000.
Field, Ernest R., II. Game board and pieces having removable indicia. 4,173,347, Cl. 273-261.000.
Findeisen, Kurt; Wagner, Kuno; and Uerdingen, Walter, to Bayer Aktiengesellschaft. Isocyanate derivatives of 1,3[oxazoles, oxazines, diazoles and diazines]. 4,173,567, Cl. 548-216.000.
Finn, Donald J. Billfold bill file with minimum panel area. 4,173,242, Cl. 150-38.000.
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Fleissner, Hans, to Vepa AG. Process for the continuous dyeing or printing of lengths of material. 4,173,452, Cl. 8-1.0XB.
Flinn, William S.: *See—*
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FMC Corporation: *See—*
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Fodor, George E.; Weatherford, William D., Jr.; and Wright, Bernard R., to United States of America, Army. Fire-safe hydrocarbon fuels. 4,173,455, Cl. 44-51.000.
Ford Motor Company: *See—*
Croswhite, Howard L.; Gregg, James H.; and Guido, Angelo L., 4,173,270, Cl. 192-3.290.
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Frayer, James A.; Stauffer, Harry C.; and Yanik, Stephen J., to Gulf Research and Development Company. Multistage residual oil hydrodesulfurization process employing segmented feed addition and product removal. 4,173,528, Cl. 208-210.000.
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Fujii, Katsumasa; and Takeda, Naoshi, to Tokyo Shibaura Kenki Kabushiki Kaisha. Boiler feed water pump control systems. 4,173,124, Cl. 60-667.000.
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Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; and Yamamoto, Toshihiko, 4,173,638, Cl. 424-263.000.
Fujimori, Noboru: *See—*
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,173,483, Cl. 430-575.000.
Fukazawa, Yoshiro; Mochinaga, Takahiko; Shirozume, Morimasa; Kishimoto, Satoru; Ito, Makoto; and Iwaya, Fukuo, to Hitachi, Ltd.; Japanese National Railways; and Hitachi Electronics Engineering Co., Ltd. Track displacement detecting and measuring system. 4,173,073, Cl. 33-1.00Q.
Fukuoka, Masaru: *See—*
Takagi, Shunichi; and Fukuoka, Masaru, 4,173,731, Cl. 315-58.000.
Fuller Company: *See—*
Cohen, Sidney M., 4,173,487, Cl. 106-103.000.
Fumakilla Limited: *See—*
Muramoto, Takayoshi; and Orita, Kunitaka, 4,173,651, Cl. 424-306.000.
Fuse, Shirou: *See—*
Asakura, Hiroshi; Chimura, Ippei; Kitazume, Keisuke; Kaneko, Yoshiyuki; Fuse, Shirou; and Ueno, Akio, 4,173,676, Cl. 428-332.000.
Gable, Larry P.: *See—*
Schmidt, Henry A.; Gable, Larry P.; and Hammel, Wallace W., Jr., 4,173,192, Cl. 112-79.00R.
GAF Corporation: *See—*
Brown, Michael J., 4,173,462, Cl. 71-86.000.
Gagas, Stanley J. Down spout adaptor assembly. 4,173,361, Cl. 285-64.000.
Gager, John C., to Gager, Terry W.; Gager, Terry W.; and Oster, Francine. Dental crown remover. 4,173,072, Cl. 433-120.000.
Gager, Terry W.: *See—*
Gager, John C., 4,173,072, Cl. 433-120.000.
Gager, John C., 4,173,072, Cl. 433-120.000.
Gaines, Ray N. Heat gathering and conducting device for thermocouple sensors. 4,173,498, Cl. 136-217.000.
Gallagher, John P. Absorptive patient underpad. 4,173,046, Cl. 5-484.000.
Gamba, Afro: *See—*
Pifferi, Giorgio; Umani-Ronchi, Achille; Farina, Carlo; and Gamba, Afro, 4,173,648, Cl. 424-294.000.
Gandon, Louis: *See—*
Demarthe, Jean-Michel; Gandon, Louis; and Goujet, Monique, 4,173,520, Cl. 204-113.000.
Ganellin, Charon R.: *See—*
Brown, Thomas H.; Durant, Graham J.; Ganellin, Charon R.; and Ife, Robert J., 4,173,644, Cl. 424-270.000.
Garcia, Luis: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,173,106, Cl. 53-449.000.
Garrison, John B., to United States of America, Navy. Passive acquisition system. 4,173,760, Cl. 343-112.00R.
Gau, Wolfgang: *See—*
Enders, Edgar; Ebbighausen, Volker; Gau, Wolfgang; Wunsche, Christian; and Stendel, Wilhelm, 4,173,645, Cl. 424-273.00R.
Gaudio, E. Lorna; and Holt, S. Kent, to Ralston Purina Company. Vegetable protein ingredient for Kamaboko products containing a polysaccharide. 4,173,657, Cl. 426-574.000.
Gault, Frank M. Alloy for soldering aluminum. 4,173,468, Cl. 75-134.00N.
Gebr. Hofmann G.m.b.H. & Co. KG, Maschinenfabrik: *See—*
Kogler, Horst; and Goebel, Eickhart, 4,173,146, Cl. 73-462.000.
Gebr. Knauf Westdeutsche Gipswerke: *See—*
Huller, Rolf; Knauf, Alfons; and Wirsching, Franz, 4,173,610, Cl. 264-28.000.
Geislinger, Leonhard. Tuned absorber for torsional vibrations with hydrostatic damping. 4,173,158, Cl. 74-574.000.
Geluk, Ronald J., to N.V. Optische Industrie "De Oude Delft". Method and apparatus for image construction. 4,173,720, Cl. 250-445.00T.
Gemel Ltd.: *See—*
Wilson, Wilfred W., 4,173,107, Cl. 53-534.000.
General Battery Corporation: *See—*
Oxenreider, Terry R., 4,173,326, Cl. 249-83.000.
General Electric Company: *See—*
Crivello, James V., 4,173,551, Cl. 260-18.0EP.
Feiker, George E., 4,173,754, Cl. 340-310.00R.
Fiedler, Howard C., 4,173,502, Cl. 148-113.000.
Huuskonen, Niilo T.; and DiBattista, Dante P., 4,173,134, Cl. 72-10.000.
Lee, Minyoung; Szala, Lawrence E.; and De Vries, Robert C., 4,173,614, Cl. 264-332.000.
Meeks, Frederick T., 4,173,263, Cl. 177-210.0EM.
Schaeffer, Robert L., 4,173,310, Cl. 241-282.100.
Sugalski, Raymond K.; and Blake, Charles R., 4,173,733, Cl. 320-48.000.
Witting, Harald L., 4,173,728, Cl. 313-163.000.
General Ionex Corporation: *See—*
Purser, Kenneth H., 4,173,712, Cl. 174-35.00R.
General Motors Corporation: *See—*
Neale, Frank T., III, 4,173,349, Cl. 277-6.000.
Genthe, James E.; and Morrison, Douglas I., to Pitney-Bowes, Inc. Electrostatic copier including photoreceptor storing apparatus. 4,173,409, Cl. 355-16.000.
George, John A.: *See—*
Meier, Joseph F.; Rudd, George E.; Pradhan, Ashok V.; George, John A.; Lippincott, Hugh W.; and Sutherland, John D., 4,173,512, Cl. 176-37.000.
George Kent Limited: *See—*
Critten, Donald L.; and Bardwell, Charles E., 4,173,149, Cl. 73-706.000.
Gerber Products Company: *See—*
Lind, Robert B., 4,173,508, Cl. 156-499.000.
Gerstman, George H.: *See—*
Olliges, William E., 4,173,341, Cl. 273-126.00A.
Gewerkschaft Eisenhutte Westfalia: *See—*
Harhoff, Karl; and Husemann, Heinz, 4,173,421, Cl. 405-291.000.
Geyer, Robert A., to Tennant Company. Scrubbing machine with tracking squeegee. 4,173,056, Cl. 15-320.000.
Gibson, Sandra F.: *See—*
Aldridge, Clifton; Gibson, Sandra F.; Vannest, Richard D.; and Rodgers, Gregory D., 4,173,515, Cl. 435-38.000.
Giesken, Kenneth F.; and Cotton, John M., to International Telephone & Telegraph Corporation. Continuously expandable switching network. 4,173,713, Cl. 179-18.0EA.
Giessner, Bernard G.; Reighter, David H.; and Stringfellow, Allen E., to Gould Inc. Method of producing electrical insulation foam. 4,173,690, Cl. 521-89.000.
Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., to Gulf Oil Corporation. Continuous high pressure mass processes for the polymerization of ethylene. 4,173,697, Cl. 526-74.000.
Gimbel, Jurgen: *See—*
Jahn, Walter; and Gimbel, Jurgen, 4,173,357, Cl. 280-808.000.

Glenn, William E.: *See*—
Schure, Alexander; and Glenn, William E., 4,173,391, Cl. 350-96.250.

Glory Kogyo Kabushiki Kaisha: *See*—
Asami, Kazuto; and Okamoto, Takashi, 4,173,232, Cl. 133-3.00R.

Glover, John B.; and Upton, John, to Hepworth Iron Company Limited, The. Female pipe coupling member with annular seal ring. 4,173,362, Cl. 285-110.000.

Godwin, William D. Board-type game simulating football game. 4,173,346, Cl. 273-247.000.

Goebel, Eickhart: *See*—
Kogler, Horst; and Goebel, Eickhart, 4,173,146, Cl. 73-462.000.

Goeth, Hanns: *See*—
Maier, Roland; Woitun, Eberhard; Reuter, Wolfgang; Wetzel, Bernd; Goeth, Hanns; and Lechner, Uwe, 4,173,647, Cl. 424-283.000.

Goff, Sidney: *See*—
Cruthers, Larry R.; James, Terrence M.; Goff, Sidney; and Alouche, Antoine R., 4,173,632, Cl. 424-232.000.

Gold, Elijah H.; and Solomon, Daniel M., to Schering Corporation. 1-Benzhydryl-2-cyanoazetidine. 4,173,566, Cl. 260-239.00A.

Gold, Elijah H.; and Chang, Wei, to Schering Corporation. Diastereoisomers of 5-(1-hydroxy-2-(1-methyl-3-phenylpropylamino)ethyl)-salicylamide. 4,173,583, Cl. 260-559.00S.

Goldschmidt, Rolf; Hansgen, Klaus; Hiersig, Heinz M.; and Kirstenpfad, Fritz, to Mannesmann Aktiengesellschaft. Hydrostatic load relief for lifting spindles. 4,173,330, Cl. 254-98.000.

Gongwer, Calvin A., to Bendix Corporation, The. Hydrodynamic configuration for towed submersible body. 4,173,195, Cl. 114-244.000.

Goodyear Tire & Rubber Company, The: *See*—
Alfio, Deregibus, 4,173,444, Cl. 425-363.000.
Kline, Richard H., 4,173,574, Cl. 260-399.000.

Gordon, Harry W. Method of treating benign prostatic hypertrophy with candimycin. 4,173,628, Cl. 424-115.000.

Gorman, Marvin; Higgens, Calvin E.; and Nagarajan, Ramakrishnan, to Eli Lilly and Company. 7-(5-Amino-5-carboxyvaler-amido)-3-(carbamoyloxymethyl)-7-methoxy-3-cephem-4-carboxylic acid. 4,173,702, Cl. 544-21.000.

Gorndt, John H.: *See*—
Bergman, Lawrence A.; and Gorndt, John H., 4,173,360, Cl. 285-51.000.

Gosman, Theodore D. Acoustical device. 4,173,715, Cl. 179-156.00R.

Gossage, Thomas M. Scriber-compass with spring-loaded center punch. 4,173,076, Cl. 33-27.00B.

Goujet, Monique: *See*—
Demarthe, Jean-Michel; Gandon, Louis; and Goujet, Monique, 4,173,520, Cl. 204-113.000.

Gould Inc.: *See*—
Giessner, Bernard G.; Reighter, David H.; and Stringfellow, Allen E., 4,173,690, Cl. 521-89.000.

Grabmeier, Josef: *See*—
Aulich, Hubert; Grabmeier, Josef; and Pink, Hans, 4,173,459, Cl. 65-3.00A.

Graco Inc.: *See*—
Vork, William D., 4,173,418, Cl. 366-128.000.

Graff, Renier J. L., to Stamicarbon, B.V. Catalyst for preparing polyalkenes. 4,173,547, Cl. 252-429.00B.

Graham, Donald W.; and Rogers, Edward F., to Merck & Co., Inc. 7-Methyl-8-methylamino-10-(1'-D-ribityl)isoalloxazine. 4,173,631, Cl. 424-180.000.

Granda, Edward J.: *See*—
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,543, Cl. 252-174.110.
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,711, Cl. 568-665.000.

Gratacos, Jaime: *See*—
Bastien, Joel; Gratacos, Jaime; and Lazarre, Flavien, 4,173,523, Cl. 204-197.000.

Gray, Tommy L., to Span Instruments, Inc. Sensor with adjustable pressure responsive detection and control. 4,173,150, Cl. 73-714.000.

Green, Howard E.; Jones, Robert J.; and O'Rell, Michael K., to TRW Inc. Bis (difluoromaleimide) capped propolymers and polymers. 4,173,700, Cl. 528-125.000.

Greenberg, Jacob; and Robertson, John E., to Anti-Pollution Systems, Inc. Sludge incinerator utilizing coiled channel immersed in molten salt and method of oxidizing sludge utilizing same. 4,173,190, Cl. 110-243.000.

Gregg, James H.: *See*—
Croswhite, Howard L.; Gregg, James H.; and Guido, Angelo L., 4,173,270, Cl. 192-3.290.

Greidinger, Dahlia S.; Cohen nee Girshowitsh, Liuba; and Epstein, Shimon, to Fertilizers & Chemicals Ltd. Method for the manufacture of improved ureaform fertilizer. 4,173,582, Cl. 260-553.00R.

Greune, Christian; and Hackl, Friedrich, to Motoren- und Turbinen-Union Munchen GmbH. Control system for a gas turbine engine, especially a vehicular gas turbine engine. 4,173,119, Cl. 60-39.16R.

Grimes, Jerry W.; Schroeder, Stephen M.; and Waters, James M., to Westinghouse Electric Corp. Insulation structures for electrical inductive apparatus. 4,173,747, Cl. 336-60.000.

Grosjean, William C.; and Hensley, John J., to International Harvester Company. Turbine nozzle and rotor cooling systems. 4,173,120, Cl. 60-39.16R.

Groves, Malcolm D.: *See*—
Dietrich, Joseph R.; Flinn, William S.; and Groves, Malcolm D., 4,173,511, Cl. 176-36.00R.

Gruaz, Eric. Ammunition for a toy pistol. 4,173,089, Cl. 42-58.000.

Gruenfeld, Norbert, to Ciba-Geigy Corporation. Indeno and naphth[1,2-D]azepines. 4,173,633, Cl. 424-244.000.

Gruffaz, Max; and Locatelli, Jean-Louis, to Rhone-Poulenc Industries. Thermosetting composition from bis-imide, N-vinyl pyrrolidone and unsaturated polyester. 4,173,595, Cl. 525-165.000.

Grumman Aerospace Corporation: *See*—
Corvelli, Nicholas, 4,173,128, Cl. 64-1.00S.

Grundy, Reed H. Motion translating mechanism. 4,173,151, Cl. 74-49.000.

Guido, Angelo L.: *See*—
Croswhite, Howard L.; Gregg, James H.; and Guido, Angelo L., 4,173,270, Cl. 192-3.290.

Gulf Oil Corporation: *See*—
Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., 4,173,697, Cl. 526-74.000.

Gulf Research and Development Company: *See*—
Frayer, James A.; Stauffer, Harry C.; and Yanik, Stephen J., 4,173,528, Cl. 208-210.000.
Schulz, Johann G. D.; and Onopchenko, Anatoli, 4,173,573, Cl. 260-346.400.
Wu, Ching-Yong; Pretzer, Wayne R.; and Kobylinski, Thaddeus P., 4,173,587, Cl. 260-593.00A.

Gurtler, Richard W., to Motorola, Inc. Optically driven solar engine. 4,173,123, Cl. 60-641.000.

Guzik, Ira: *See*—
Bloch, Alan; Coviello, Frank A.; Guzik, Ira; and Puebla, Candido, 4,173,714, Cl. 179-99.00R.

Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic emulsions for use in flash exposure. 4,173,483, Cl. 430-575.000.

Hackl, Friedrich: *See*—
Greune, Christian; and Hackl, Friedrich, 4,173,119, Cl. 60-39.16R.

Haeussler, Ernest. Pickup unit for lifting concrete body. 4,173,367, Cl. 294-83.00R.

Halfon, Leon. Therapeutic adornments utilizing solar cells. 4,173,229, Cl. 128-419.00R.

Hall, John B.: *See*—
Yoshida, Takao; Mookherjee, Braja D.; Kamath, Venkatesh; Hall, John B.; Taylor, William I.; and Schmitt, Frederick L., 4,173,585, Cl. 260-586.00R.

Hallman, Robert W.: *See*—
Shipman, James J.; Hallman, Robert W.; Tenney, Linwood P.; and Beall, Leman G., Jr., 4,173,503, Cl. 156-123.00R.

Halstead, Kenneth G., to Westinghouse Electric Corp. Remote lubrication system for vertical motor shafts. 4,173,375, Cl. 308-134.100.

Haluska, Loren A., to Dow Corning Corporation. Non-coloring, abrasion resistant, adherent coating for gold and silver surfaces. 4,173,553, Cl. 260-29.20M.

Hamayasu, Norio; and Kamikawa, Kiyohide, to Shimano Industrial Company, Limited. Sound generating mechanism for a spinning reel. 4,173,317, Cl. 242-84.21R.

Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Print head. 4,173,184, Cl. 101-111.000.

Hamisch, Paul H., Jr.; and Hubbard, David W., to Monarch Marking Systems, Inc. Composite label web and method of using same. 4,173,293, Cl. 221-1.000.

Hammel, Wallace W., Jr.: *See*—
Schmidt, Henry A.; Gable, Larry P.; and Hammel, Wallace W., Jr., 4,173,192, Cl. 112-79.00R.

Hammelmann, Paul, to Paul Hammelmann Maschinenfabrik. Plunger pump. 4,173,435, Cl. 417-469.000.

Hamprecht, Gerhard, to BASF Aktiengesellschaft. Production of β-haloalkylaminosulfonyl halides. 4,173,580, Cl. 260-543.00R.

Hanakata, Takayoshi, to Canon Kabushiki Kaisha. Printer device. 4,173,273, Cl. 400-120.000.

Hanifin, John W., Jr.; and Ridge, David N., to American Cyanamid Company. Cis-2-benzoyl-3-hydroxy-2-alkenonitriles as anti-inflammatory agents. 4,173,650, Cl. 424-304.000.

Hanji, Motoyasu, to Kabushiki Kaisha Kinekisha-Kenkyujo. Tuning fork-type piezoelectric vibrator. 4,173,726, Cl. 310-366.000.

Hannart, Jean A. A. J. Hypotensive ajmalicine derivatives. 4,173,635, Cl. 424-256.000.

Hansen, Bobbie F., Jr. Self-acting implement. 4,173,110, Cl. 56-10.200.

Hansgen, Klaus: *See*—
Goldschmidt, Rolf; Hansgen, Klaus; Hiersig, Heinz M.; and Kirstenpfad, Fritz, 4,173,330, Cl. 254-98.000.

Hanson, Robert S.; Kronenberger, Paul E.; and Whistler, Charles C., Jr., to White Consolidated Industries, Inc. Refrigerator sealed food storage drawer. 4,173,378, Cl. 312-296.000.

Harada, Hiroyuki: *See*—
Nakamatsu, Shuji; Harada, Hiroyuki; Shinomiya, Yoshitugu; and Omizu, Tuyoshi, 4,173,525, Cl. 204-275.000.

Hareng, Michel; Hehlen, Robert; and Le Berre, Serge, to Thomson-CSF. Liquid crystal display device. 4,173,757, Cl. 340-765.000.

Harhoff, Karl; and Husemann, Heinz, to Gewerkschaft Eisenhutte Westfalia. Shield apparatus for use in tunnelling or mining. 4,173,421, Cl. 405-291.000.

Harrison, William E.: *See*—
Cruff, Carlton E.; and Harrison, William E., 4,173,079, Cl. 34-217.000.

Harry Feick Co., Inc.: *See*—
Ittner, Nelson C., 4,173,307, Cl. 239-265.290.
Harvey, Donald M., to Eastman Kodak Company. Apparatus for displaying alphanumeric information coded on a film cartridge. 4,173,401, Cl. 354-21.000.
Hasegawa, Akira: *See*—
Kishida, Kazuo; Hasegawa, Akira; and Mohri, Hiroshi, 4,173,600, Cl. 525-76.000.
Hasegawa, Niichiro: *See*—
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Katusima, Sensaku; and Kaneko, Ichiro, 4,173,696, Cl. 526-62.000.
Hashimoto, Akira: *See*—
Hirasawa, Masataka; Hashimoto, Akira; Nagao, Kenichi; and Kobayashi, Toshiaki, 4,173,734, Cl. 323-8.000.
Hashimoto, Hiroshi; and Mori, Kinya, to Sanyo Machine Works, Ltd. Device for tightening bolts. 4,173,059, Cl. 29-240.000.
Hashimoto, Shunichi: *See*—
Noguchi, Hiroshi; Hashimoto, Shunichi; Kitamura, Shigeyoshi; Matsuo, Takashi; Mine, Akihiko; and Kamoshita, Katsuzo, 4,173,464, Cl. 71-118.000.
Hashimoto, Tadanori: *See*—
Yamada, Koichi; Hashimoto, Tadanori; and Horinouchi, Kazuo, 4,173,518, Cl. 204-67.000.
Hauck, Frederic P.; Condon, Michael E.; and Reid, Joyce, to E. R. Squibb & Sons, Inc. Hypotensive perhydro naphthalene pentol derivatives. 4,173,640, Cl. 424-267.000.
Hauck, Frederic P.: *See*—
Sundeen, Joseph E.; Dejneka, Tamara; and Hauck, Frederic P., 4,173,649, Cl. 424-304.000.
Haug, Juergen: *See*—
Elliehausen, Heinrich; Hohenschutz, Heinz; Strohmeyer, Max; and Haug, Juergen, 4,173,589, Cl. 260-604.0HF.
Hauser, James C.: *See*—
Underwood, Ronald G.; and Hauser, James C., 4,173,049, Cl. 5-451.000.
Hausler, Michael; and Kanngiesser, Karl-Werner, to BBC Brown Boveri & Company Limited. Method and apparatus for controlling the real and reactive power behavior of a high voltage D.C. transmission (HDT) system. 4,173,780, Cl. 363-51.000.
Haverbusch, Paul J., to Lodge & Shipley Company, The. Apparatus for frictionally gripping the interior surface of a container during handling by an article transferring means. 4,173,368, Cl. 294-88.000.
Hawker Siddeley Aviation Limited: *See*—
Thorby, Douglas C.; and Johnson, John, 4,173,323, Cl. 244-114.00R.
Hawker Siddeley Dynamics Limited: *See*—
Standing, John M.; and Sheppard, Joseph S., 4,173,376, Cl. 308-189.00A.
Hayashi, Yoshio: *See*—
Akashi, Kageyasu; Hayashi, Yoshio; Arakawa, Tatsumi; Kimura, Takeo; and Kobayashi, Hidehiko, 4,173,482, Cl. 430-619.000.
Hayes, James A., to Fairchild Camera and Instrument Corporation. Insulated gate field-effect transistor read-only memory cell. 4,173,766, Cl. 357-23.000.
Hayes, John F. Method of treating waste material containing radioactive cesium isotopes. 4,173,546, Cl. 252-301.10W.
Heald, David L.; Lee, Teh-Hsuang; and Khosla, Rajinder P., to Eastman Kodak Company. V-MOS imaging array. 4,173,765, Cl. 357-23.000.
Heath, William H.; and Richman, Jack, to Singer Company, The. Inertial system having correction means for effects of gravitational anomalies. 4,173,784, Cl. 364-453.000.
Heberlein Hispano SA: *See*—
Vignon, Louis, 4,173,057, Cl. 19-159.00R.
Heckenkamp, Edward B., to Allis-Chalmers Corporation. Rear drive assembly with load sensing. 4,173,259, Cl. 172-10.000.
Heffley, Scott A.; and Schatz, Klaus W., to Mobil Oil Corporation. Method and means for separating suspensions of gasiform material and fluidizable solid particle material. 4,173,527, Cl. 208-153.000.
Hehlen, Robert: *See*—
Hareng, Michel; Hehlen, Robert; and Le Berre, Serge, 4,173,757, Cl. 340-765.000.
Heikkinen, Leo L.; and Lundborg, Charles L., to LaFont Corporation. Firewood systems. 4,173,237, Cl. 144-3.00K.
Hein, Wolfgang, to Carl Schleicher & Schull. Clamp assembly for high pressure diaphragm test cells. 4,173,364, Cl. 292-256.670.
Heins, Sidney M. Method for removal of sulfur from coal in stoker furnaces. 4,173,454, Cl. 44-1.0SR.
Heinz, Werner. Rotary viscometer. 4,173,142, Cl. 73-60.000.
Hempfling, Walter L. Sign structure. 4,173,086, Cl. 40-607.000.
Hennes, John H.; and Crecente, Christopher P., to Badische Corporation. Color blended yarns with enhanced luminosity. 4,173,678, Cl. 428-364.000.
Hensley, John J.: *See*—
Grosjean, William C.; and Hensley, John J., 4,173,120, Cl. 60-39.16R.
Hentzelt, Walther E.; Nolte, Hans-Henning; and von Reis, Wolf, to BFG Glassgroup. Fire-screening panel. 4,173,668, Cl. 428-34.000.
Hepworth Iron Company Limited, The: *See*—
Glover, John B.; and Upton, John, 4,173,362, Cl. 285-110.000.
Herbline, Celestin L. Extinguishing product comprising an uninflammable powder and liquid. 4,173,538, Cl. 252-8.000.
Herdenberger, Andre: *See*—
Vallon, Roger; Herdenberger, Andre; and Delhomelle, Marc, 4,173,675, Cl. 428-291.000.
Herrera, Joseph O.: *See*—
Lichti, Robert D.; and Herrera, Joseph O., 4,173,279, Cl. 198-500.000.
Heslop, Philip J.; and Matthews, Roger J., to Mars Limited. Chassis mounting for a machine. 4,173,377, Cl. 312-29.000.
Hess, Fritz, to EPM AG. Machine for cutting the lead ends of components mounted at printed-wiring boards. 4,173,160, Cl. 83-174.000.
Hesston Corporation: *See*—
Adee, Raymond A., 4,173,262, Cl. 172-599.000.
Hetland, Philip R. Lawn litter sled. 4,173,351, Cl. 280-19.000.
Heuer, Dieter: *See*—
Tauber, Manfred; Heuer, Dieter; Kroncke, Max; and Schimmelpfennig, Peter, deceased, 4,173,719, Cl. 250-310.000.
Hibbert, William T. Animal halter. 4,173,109, Cl. 54-24.000.
Hicks, Patrick C.; Benson, Ronald J.; and Roberts, Howard M., to Hicks, Patrick C. Apparatus for self teaching a musical instrument. 4,173,168, Cl. 84-470.00R.
Hiersig, Heinz M.: *See*—
Goldschmidt, Rolf; Hansgen, Klaus; Hiersig, Heinz M.; and Kirstenpfad, Fritz, 4,173,330, Cl. 254-98.000.
Higashi, Fukuji: *See*—
Yamazaki, Noboru; and Higashi, Fukuji, 4,173,563, Cl. 260-112.50R.
Higgens, Calvin E.: *See*—
Gorman, Marvin; Higgens, Calvin E.; and Nagarajan, Ramakrishnan, 4,173,702, Cl. 544-21.000.
High Standard, Inc.: *See*—
Baker, Richard L., 4,173,090, Cl. 42-67.000.
Hijikata, Akiko: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,173,630, Cl. 424-177.000.
Hilbert, Thomas K.: *See*—
Swapceinski, John P.; Hilbert, Thomas K.; and McGlen, James A., 4,173,405, Cl. 355-3.0DD.
Hildebrandt, Jack A.; Pointer, Denver K.; and Stilley, Herschel H., to Clark Equipment Company. Steel torsional element and method for making. 4,173,501, Cl. 148-16.500.
Hills, Richard E., to Pittsburgh-Des Moines Steel Company. Floating roof seal. 4,173,291, Cl. 220-225.000.
Hiramatsu, Eiji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Canister. 4,173,207, Cl. 123-136.000.
Hirasawa, Masataka; Hashimoto, Akira; Nagao, Kenichi; and Kobayashi, Toshiaki, to Tokyo Shibaura Electric Co., Ltd. Voltage dividing integrated circuit device. 4,173,734, Cl. 323-8.000.
Hirdes, Rudiger. Apparatus for filling magazine of dental appliance. 4,173,236, Cl. 141-249.000.
Hitachi Electronics Engineering Co., Ltd.: *See*—
Fukazawa, Yoshiro; Mochinaga, Takahiko; Shirozume, Morimasa; Kishimoto, Satoru; Ito, Makoto; and Iwaya, Fukuo, 4,173,073, Cl. 33-1.00Q.
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Mimura, Akio; Suzuki, Takaya; and Yagiyu, Seturo, 4,173,674, Cl. 428-220.000.
Morinaga, Shigeki; Maeda, Takeo; Takahashi, Tadashi; and Ishizaki, Kosho, 4,173,193, Cl. 112-275.000.
Takayama, Teruo; Yamada, Kinsaku; and Niida, Chiaki, 4,173,204, Cl. 123-119.00A.
Hitachi, Ltd: *See*—
Yamada, Kazuji; Sato, Hideo; Okayama, Tsutomu; Nishihara, Motohisa; Matsuoka, Yoshitaka; Katohgi, Katsuya; Matsuda, Yasumasa; and Shimada, Satoshi, 4,173,148, Cl. 73-766.000.
Hoechst Aktiengesellschaft: *See*—
Birke, Walter; von der Eltz, Hans-Ulrich; and Schon, Franz, 4,173,077, Cl. 34-23.000.
Kleber, Rolf; and Ehrl, Winfried, 4,173,679, Cl. 428-375.000.
Kleiner, Hans-Jerg; Linke, Fritz; and Dursch, Walter, 4,173,601, Cl. 260-938.000.
Krause, Johannes; Reichert, Gunter; Mainzer, Franz; and Niermann, Hermann, 4,173,621, Cl. 423-303.000.
Schmidbaur, Hubert; and Karsch, Hans-Heinz, 4,173,590, Cl. 260-606.50P.
Staendeke, Horst, 4,173,578, Cl. 260-502.40R.
Hoesch Werke Aktiengesellschaft: *See*—
Balon, Johannes; and Oldendorf, Manfred, 4,173,182, Cl. 101-4.000.
Hoff, Raymond E.: *See*—
Pullukat, Thomas J.; Shida, Mitsuzo; and Hoff, Raymond E., 4,173,548, Cl. 252-430.000.
Hoffman, Henry R.: *See*—
Sidenstick, Harry L.; and Hoffman, Henry R., 4,173,069, Cl. 30-228.000.
Hoffman, Joseph H.; and Thompson, Daniel G., to Westinghouse Electric Corp. Centrifugal fan, shaft, plate and hub assembly. 4,173,429, Cl. 416-184.000.
Hohenschutz, Heinz: *See*—
Elliehausen, Heinrich; Hohenschutz, Heinz; Strohmeyer, Max; and Haug, Juergen, 4,173,589, Cl. 260-604.0HF.
Holemann, Paul, to Linde Aktiengesellschaft. Method of operating a cutting burner. 4,173,499, Cl. 148-9.00R.

Holkko, Seppo; Lehtinen, Jukka; and Majaniemi, Pekka, to Oy Tampella AB. Extended nip press for a paper machine. 4,173,249, Cl. 162-360.00R.
Holstead, Colin; Kilminster, Kenneth N.; and Simons, Michael J., to Eastman Kodak Company. Photographic materials comprising azo sensitizing dyes. 4,173,478, Cl. 430-353.000.
Holt, S. Kent: *See*—
Gaudio, E. Lorna; and Holt, S. Kent, 4,173,657, Cl. 426-574.000.
Holtz, John W., to Allied Chemical Corporation. Process for removal of alumina from aqueous alkali metal chromate solutions. 4,173,618, Cl. 423-58.000.
Homan, Gary R.; Maxson, Myron T.; and Toporcer, Louis H., to Dow Corning Corporation. Treatment of reinforcing silicas with amidosiloxanes. 4,173,560, Cl. 260-37.0SB.
Honeywell Inc.: *See*—
Durbin, Damien E., 4,173,145, Cl. 73-422.0GC.
Honeywell Information Systems, Inc.: *See*—
Couleur, John F.; and Scriver, Robert E., 4,173,783, Cl. 364-200.000.
Hooker Chemicals & Plastics Corp.: *See*—
Chen, Joseph L. P., 4,173,603, Cl. 260-986.000.
Hope Co., Ltd.: *See*—
Murata, Masahiro, 4,173,354, Cl. 280-605.000.
Hopkins, Walter M. Apparatus having expanding and contracting chamber. 4,173,439, Cl. 418-58.000.
Horike, Masanori; Shibata, Isamu; and Maeda, Ikuo, to Ricoh Company, Ltd. Optoelectronic sensing apparatus. 4,173,402, Cl. 354-25.000.
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Horowitz, Alexandre; van der Hoorn, Rudolf J. G. A.; and Kummeling, Jozef W. M., to Volvo Car B.V. Infinitely variable cone pulley gear. 4,173,156, Cl. 74-230.17F.
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Houdion, Pierre. Balancing and holding device for a molten metal supply tundish in a continuous casting machine. 4,173,250, Cl. 164-434.000.
Howell, Stephen L., to Kimball International, Inc. Tone generator for electronic organ. 4,173,163, Cl. 84-1.010.
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HPM Corporation: *See*—
Kruder, George A., 4,173,417, Cl. 366-89.000.
Hubbard, David W.: *See*—
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Hudson, Willard G.: *See*—
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Hughes Aircraft Company: *See*—
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Hughes, John M. F.: *See*—
Benson, Nigel C.; Hughes, John M. F.; Kingslake, Denis; and Symonds, David G., 4,173,611, Cl. 264-138.000.
Hukuba Kogyo Kabushiki Kaisha: *See*—
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Huller, Rolf; Knauf, Alfons; and Wirsching, Franz, to Gebr. Knauf Westdeutsche Gipswerke. Process for the manufacture of lump calcium sulfate. 4,173,610, Cl. 264-28.000.
Husemann, Heinz: *See*—
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Husky Injection Molding Systems: *See*—
Rees, Herbert; and Schad, Robert D., 4,173,448, Cl. 425-549.000.
Huuskonen, Niilo T.; and DiBattista, Dante P., to General Electric Company. Apparatus and method for guiding a ring structure during the manufacture thereof. 4,173,134, Cl. 72-10.000.
Hyvarinen, Wayne E.; and Rosell, Lloyd J., to Westinghouse Electric Corp. Parallel AC electrical system with differential protection immune to high current through faults. 4,173,774, Cl. 361-87.000.
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Pifferi, Giorgio; Umani-Ronchi, Achille; Farina, Carlo; and Gamba, Afro, 4,173,648, Cl. 424-294.000.
ICI Americas Inc.: *See*—
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Ife, Robert J.: *See*—
Brown, Thomas H.; Durant, Graham J.; Ganellin, Charon R.; and Ife, Robert J., 4,173,644, Cl. 424-270.000.
Iijima, Yukihiko, to Nippon Electric Co., Ltd. High speed predictive encoding and decoding system for television video signals. 4,173,771, Cl. 358-135.000.
Imai, Isao; and Shiozaki, Hiroyuki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Continuous rolling mill. 4,173,133, Cl. 72-8.000.
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Inagami, Masaaki, to Nippon Zeon Co., Ltd. Polychloroprene rubber composition. 4,173,694, Cl. 525-351.000.
Infusino, Ralph J., to Riddell, Inc. Athletic shoe construction. 4,173,083, Cl. 36-59.00R.
Inmont Corporation: *See*—
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International Business Machines Corporation: *See*—
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Chang, Leroy L.; and Esaki, Leo, 4,173,763, Cl. 357-12.000.
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International Computers Limited: *See*—
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International Flavors & Fragrances Inc.: *See*—
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Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,711, Cl. 568-665.000.
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Israel, Seymour. Surfactant system for fuel catalyzer. 4,173,449, Cl. 431-4.000.
Ito, Makoto: *See*—
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Ito, Takeo: *See*—
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Ittner, Nelson C., to Harry Feick Co., Inc.; and JRS Mfg. Inc. Load bearing vane structure for thrust reversal. 4,173,307, Cl. 239-265.290.
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Jahn, Walter; and Gimbel, Jurgen, to Daimler-Benz Aktiengesellschaft. Installation for adjusting the height of the upper anchoring or deflection point for the shoulder belt of a belt system. 4,173,357, Cl. 280-808.000.
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Johnson, Elwin L.; Kilby, Jack S.; Lathrop, Jay W.; McFerren, John S.; and Myers, David J., to Kilby, Jack S. Glass support light energy converter. 4,173,494, Cl. 136-89.0TF.
Johnson, John: *See—*
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Krzewinski-Morris, Henrietta, 4,173,042, Cl. 2-197.000.
Johnson, Lloyd D.: *See—*
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Johnston, Lyman C. Massage apparatus. 4,173,217, Cl. 128-734.000.
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Jordan, Edgar R. Engine control system and valve deactivator thereof. 4,173,209, Cl. 123-198.00F.
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Judge, Bernard. Building construction. 4,173,102, Cl. 52-73.000.
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Kantarian, Edward T.; and Staub, Donald F. Conveyor load shunting apparatus. 4,173,274, Cl. 198-367.000.
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Kawaguchi, Katsuyuki, to Mitsubishi Jukogyo Kabushiki Kaisha. Fuel combustion apparatus employing staged combustion. 4,173,118, Cl. 60-39.650.
Kawaguchi, Kenryo, to Oiles Kogyo Kabushiki Kaisha. Process for producing porous cast iron. 4,173,500, Cl. 148-16.000.
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Keller, Douglas V., Jr.: *See—*
Smith, Clay D.; and Keller, Douglas V., Jr., 4,173,530, Cl. 209-9.000.
Kellner, Walter: *See—*
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Kelly, Donald A. Solar power system, with high concentration, linear reflective solar panels. 4,173,213, Cl. 126-425.000.
Kelly, Earl M., to Envirotech Corporation. Sludge thickening apparatus and process. 4,173,534, Cl. 210-195.300.

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Kendall Co., The: *See—*
Pendergrass, John E.; and Melton, David T., 4,173,131, Cl. 66-192.000.

Kenderesy, Tamas: *See—*
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Kent, Ronald A.; and Fein, Marvin M., to Dart Industries Inc. Catalyst composition for decomposing ozone. 4,173,549, Cl. 252-463.000.

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Kett Tool Co.: *See—*
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Khosla, Rajinder P.: *See—*
Heald, David L.; Lee, Teh-Hsuang; and Khosla, Rajinder P., 4,173,765, Cl. 357-23.000.

Kikumoto, Ryoji: *See—*
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Kilby, Jack S.: *See—*
Johnson, Elwin L.; Kilby, Jack S.; Lathrop, Jay W.; McFerren, John S.; and Myers, David J., 4,173,494, Cl. 136-89.0TF.

Kilgore, Marion D., to Otis Engineering Corporation. Subsurface safety valve. 4,173,256, Cl. 166-324.000.

Kilminster, Kenneth N.: *See—*
Holstead, Colin; Kilminster, Kenneth N.; and Simons, Michael J., 4,173,478, Cl. 430-353.000.

Kimball International, Inc.: *See—*
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Kimura, Takeo: *See—*
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Kimura, Tetsuo: *See—*
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King, John F.: *See—*
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Kingslake, Denis: *See—*
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Kinoshita, Akira: *See—*
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Kinsman, Gordon F., to Polaroid Corporation. Methods for making laminar cells. 4,173,066, Cl. 29-623.100.

Kiraly, Ernest F.; and Motta, Vincent C., to Warner-Lambert Company. Dispenser for bonded razor blade cartridges. 4,173,285, Cl. 206-356.000.

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Kirstenpfad, Fritz: *See—*
Goldschmidt, Rolf; Hansgen, Klaus; Hiersig, Heinz M.; and Kirstenpfad, Fritz, 4,173,330, Cl. 254-98.000.

Kishida, Kazuo; Hasegawa, Akira; and Mohri, Hiroshi, to Mitsubishi Rayon Co., Limited. Multi-stage sequentially produced polymer composition. 4,173,600, Cl. 525-76.000.

Kishimoto, Satoru: *See—*
Fukazawa, Yoshiro; Mochinaga, Takahiko; Shirozume, Morimasa; Kishimoto, Satoru; Ito, Makoto; and Iwaya, Fukuo, 4,173,073, Cl. 33-1.00Q.

Kissell, Fred N.; Maksimovic, Slavoljub D.; and Matta, Joseph E., to United States of America, Interior. Method of determining gas leakage through a mine stopping. 4,173,141, Cl. 73-40.700.

Kitamura, Shigeyoshi: *See—*
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Kitazume, Keisuke: *See—*
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Kleber, Rolf; and Ehrl, Winfried, to Hoechst Aktiengesellschaft. Liquid thermostable phosphoric acid esters for the fiber conditioning. 4,173,679, Cl. 428-375.000.

Kleiner, Hans-Jerg; Linke, Fritz; and Dursch, Walter, to Hoechst Aktiengesellschaft. Carbamoyl-oxyalkyl-phosphinic acid derivatives. 4,173,601, Cl. 260-938.000.

Kline, Richard H., to Goodyear Tire & Rubber Company, The. 3,5-Ditertiary alkyl-4-hydroxyphenyl (alkyl) 6-acyloxy-4-thia hexanoates and hexenamides as antioxidants. 4,173,574, Cl. 260-399.000.

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Knauf, Alfons: *See—*
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Kneip, George D., Jr., to Varian Associates, Inc. Selective excitation of coils comprising a superconducting magnet. 4,173,775, Cl. 361-141.000.

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Knowlton, Christopher M.: *See—*
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Kobayashi, Koichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Wide angle retrofocus lens system. 4,173,395, Cl. 350-214.000.

Kobayashi, Seishichi; Mori, Tatsuo; and Ueno, Hiroshi, to Toyo Seikan Kaisha, Ltd. Bonded can having high hot water resistance and undercoating composition for use in production thereof. 4,173,290, Cl. 220-75.000.

Kobayashi, Toshiaki: *See—*
Hirasawa, Masataka; Hashimoto, Akira; Nagao, Kenichi; and Kobayashi, Toshiaki, 4,173,734, Cl. 323-8.000.

Kobayashi, Yuichi: *See—*
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Kobylinski, Thaddeus P.: *See—*
Wu, Ching-Yong; Pretzer, Wayne R.; and Kobylinski, Thaddeus P., 4,173,587, Cl. 260-593.00A.

Koenders, Peter; Van der Zeeuw, Abraham J.; and Kok, Riekert, to Shell Oil Company. Extraction of copper values from aqueous solution. 4,173,616, Cl. 423-24.000.

Koepke, Donald B., to Thomas International Corporation. Tab switch mechanism for musical instruments. 4,173,166, Cl. 84-343.000.

Kogen Industries, Inc.: *See—*
Kopas, Peter P., 4,173,371, Cl. 296-137.00R.

Kogler, Horst; and Goebel, Eickhart, to Gebr. Hofmann G.m.b.H. & Co. KG, Maschinenfabrik. Apparatus for balancing unbalanced bodies. 4,173,146, Cl. 73-462.000.

Koike, Masahiko: *See—*
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Koizumi, Yutaka: *See—*
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Kok, Riekert: *See—*
Koenders, Peter; Van der Zeeuw, Abraham J.; and Kok, Riekert, 4,173,616, Cl. 423-24.000.

Koll, Stanley J., to American Flange & Manufacturing Co., Inc. Bottle capping apparatus and method. 4,173,104, Cl. 53-201.000.

Kollberg, Sten; and Tiberg, Lars, to ASEA AB. Electromagnetic valve with slag indicator. 4,173,299, Cl. 222-594.000.

Kondo, Yukio; Kawabata, Minoru; and Suzuki, Mikio, to Toyoda-Koki Kabushiki-Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Continuously variable speed converter for cooperative use with a fluid pump. 4,173,152, Cl. 74-190.000.

Konigl, Georg: *See—*
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Konishiroku Photo Industry Co., Ltd.: *See—*
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,173,483, Cl. 430-575.000.
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Kopas, Peter P., to Kogen Industries, Inc. Combination cab and canopy for mine roof bolting machine. 4,173,371, Cl. 296-137.00R.

Koppes, William M.; Adolph, Horst G.; and Sitzmann, Michael E., to United States of America, Navy. Process for the preparation of 1,3,5-trifluoro-2,4,6-trinitrobenzene. 4,173,591, Cl. 260-646.000.

Kotzsch, Hans-Joachim: *See—*
Seiler, Claus-Dieter; Vahlensieck, Hans-Joachim; and Kotzsch, Hans-Joachim, 4,173,576, Cl. 260-448.80R.

Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Katusima, Sensaku; and Kaneko, Ichiro, to Shin-Etsu Chemical Co., Ltd. Method for the polymerization of vinyl monomers. 4,173,696, Cl. 526-62.000.

Kramer, Richard W. Low well yield control system and method. 4,173,255, Cl. 166-314.000.

Krapcho, John; and Turk, Chester F., to E. R. Squibb & Sons, Inc. Basically-substituted tricyclic pyrazoles useful as antiinflammatory agents. 4,173,634, Cl. 424-248.400.

Kraska, Allen R., to Pfizer Inc. Di-O-n-alkyl glycerol derivatives as immune stimulants. 4,173,641, Cl. 424-267.000.

Krause, Johannes; Reichert, Gunter; Mainzer, Franz; and Niermann, Hermann, to Hoechst Aktiengesellschaft. Process for improving the reactivity of phosphorus pentasulfide. 4,173,621, Cl. 423-303.000.

Kremer, Manfred, to Still GmbH. Device for measuring the torque in a shaft. 4,173,265, Cl. 180-79.100.

Kroncke, Max: *See—*
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Kronenberger, Paul E.: *See—*
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Kruder, George A., to HPM Corporation. Extrusion apparatus and method. 4,173,417, Cl. 366-89.000.

Kruse, Walter M., to ICI Americas Inc. High mannitol process (enzymatic isomerization). 4,173,514, Cl. 435-94.000.

Krzewinski-Morris, Henrietta, to Johnson & Johnson. Head covering garment. 4,173,042, Cl. 2-197.000.

Kubota, Naohiro: *See—*
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,173,599, Cl. 525-66.000.

Kubota, Seizo, to Sato Kogyo Kabushiki Kaisha. Method of injecting a back filling injection material in a shield forming process. 4,173,430, Cl. 417-53.000.

Kubotera, Kikuo: *See—*
Shiba, Keisuke; Kubotera, Kikuo; and Kashiwabara, Akira, 4,173,477, Cl. 430-264.000.

Kubovits, Imre; Meszaros, Imre; Kaszatnitzky, Ferenc; Szabo, Mrs. Laszlo; and Ottlik, Peter, to Tatabanyai Szenbanyak. Artificial stone and method for making. 4,173,484, Cl. 106-39.600.

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Kucharczyk, Eckhard, to Siegenia-Frank KG. Air vent. 4,173,175, Cl. 98-41.0SV.

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Kuehnle, Manfred R., to Coulter Information Systems, Inc. Electrophotographic contact duplicating apparatus and method. 4,173,407, Cl. 355-12.000.

Kuhla, Donald E.: *See—*
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,173,572, Cl. 260-345.90R.

Kuhnell, Thomas J.; Tanner, Randall C.; and Dryak, Alois V., to Cincinnati Milacron Inc. Method and apparatus for cutting a thread on a rotating workpiece. 4,173,786, Cl. 364-475.000.

Kumakawa, Shozo. Method of making boards and packing cases made therefrom. 4,173,287, Cl. 217-65.000.

Kummeling, Jozef W. M.: *See—*
Horowitz, Alexandre; van der Hoorn, Rudolf J. G. A.; and Kummeling, Jozef W. M., 4,173,156, Cl. 74-230.17F.

Kunimune, Kohichi: *See—*
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Kurath, Paul: *See—*
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LaBarre, Robert E.: *See—*
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Jarque, Ricardo G.; Cartes, Juan B.; Jimenez, Rosa L.; Roldan, Cristobal M.; and Peinado, Fernando R., 4,173,705, Cl. 546-283.000.

LaFont Corporation: *See—*
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Laliotis, Theodore A., to Atmospheric Sciences, Inc. Method and apparatus for measuring dimensions. 4,173,788, Cl. 364-560.000.

Lamperti, Enrico. Machine for coiling metal wire. 4,173,135, Cl. 72-21.000.

Lange, Wilfried, to Dieter Haubold Industrielle Nagelgerate, Firma. Working process of a pneumatic operated ramming tool. 4,173,171, Cl. 91-25.000.

Larsen, Olaf E., to Phillips Petroleum Company. Choke ring for pipe extrusion die. 4,173,446, Cl. 425-380.000.

Larsson, Karl H.: *See—*
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Lasky, Jerome B.; and Moran, Paul R., to United States of America, Energy. Method of preparing a thermoluminescent phosphor. 4,173,660, Cl. 427-38.000.

Lathrop, Jay W.: *See—*
Johnson, Elwin L.; Kilby, Jack S.; Lathrop, Jay W.; McFerren, John S.; and Myers, David J., 4,173,494, Cl. 136-89.0TF.

Laurin, Bernard L.: *See—*
Rotenberg, Don H.; Cuffe, Patricia M.; Laurin, Bernard L.; and Ramirez, Peter R., 4,173,490, Cl. 106-287.140.

Law, Andrew B., to Rohm and Haas Company. Synergistic microbiocidal compositions. 4,173,643, Cl. 424-270.000.

Law, David C. F., to Arbrook, Inc. Oxydiacetaldehyde compositions used as disinfectants. 4,173,653, Cl. 424-333.000.

Lawson, Thomas M.: *See—*
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Lazarre, Flavien: *See—*
Bastien, Joel; Gratacos, Jaime; and Lazarre, Flavien, 4,173,523, Cl. 204-197.000.

Lease, Robert D., to Clark Equipment Company. Rotary feed cup having a spacer and a pivoted seal. 4,173,298, Cl. 222-368.000.

Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, to Mira-Pak Inc. Carton forming method. 4,173,106, Cl. 53-449.000.

Le Berre, Serge: *See—*
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Lechner, Uwe: *See—*
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Lederer, David B., to Detection Systems Inc. Optical assembly. 4,173,717, Cl. 250-239.000.

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Lee, Minyoung; Szala, Lawrence E.; and De Vries, Robert C., to General Electric Company. Process for preparing a polycrystalline diamond body/silicon nitride substrate composite. 4,173,614, Cl. 264-332.000.

Lee, Teh-Hsuang: *See—*
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Leesona Corporation: *See—*
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LeFevre, Robert J.: *See—*
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Lehmann, William L., to RCA Corporation. Antenna isolation device. 4,173,742, Cl. 333-100.000.

Lehmkuhl, Herbert; and Eisenbach, Wilhelm, to Studiengesellschaft Kohle mbH. Electrochemical process for dicyclopentadienyl iron. 4,173,517, Cl. 204-59.0QM.

Lehtinen, Jukka: *See—*
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Leinfellner, Herwig: *See—*
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Leisure Group, The: *See—*
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Leka, George T.; and Paradis, Roland C., to Perkin-Elmer Corporation, The. Dual-piston reciprocating pump assembly. 4,173,437, Cl. 417-521.000.

Lentine, Frank N., to Sybron Corporation. Disposable dental tray. 4,173,219, Cl. 128-260.000.

Lever Brothers Company: *See—*
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Lewandowski, Leon M., to Sanders Associates, Inc. Acoustic transducing system. 4,173,748, Cl. 367-123.000.

Lewin, Ian: *See—*
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Liautaud, James P., to American Antenna Corporation. Mobile antenna mounting assembly. 4,173,761, Cl. 343-715.000.

Libis, Fernand, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Method and device for lubricating compressors. 4,173,440, Cl. 418-84.000.

Licata, William H., to United States of America, Navy. Inertial guidance system for vertically launched missiles without roll control. 4,173,785, Cl. 364-453.000.

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Lichti, Robert D.; and Herrera, Joseph O., to Park Mobile, Inc., by said Joseph O. Herrera and Paul J. Ashley. Fluid metering and transfer system. 4,173,279, Cl. 198-500.000.

Lieb, Claude, to Balzers Aktiengesellschaft fur Hochvakuumtechnik und Dunne Schichten. Clamping device for transporting specimen plates. 4,173,365, Cl. 294-19.00R.

Liebman, Israel; Duda, Frank T.; and Conti, Ronald S., to United States of America, Interior. Trigger device for explosion barrier. 4,173,140, Cl. 73-35.000.

Light, Bette M.: *See—*
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Lin, Victor J., to Celanese Corporation. Spray spinning nozzle having convergent gaseous jets. 4,173,443, Cl. 425-66.000.

Lind, Robert B., to Gerber Products Company. Apparatus for handling glass jars. 4,173,508, Cl. 156-499.000.

Linde Aktiengesellschaft: *See—*
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Lippincott, Hugh W.: *See—*
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Locatelli, Jean-Louis: *See—*
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Locke, Gerald M., to Corning Glass Works. Method of forming a quadriplanar component. 4,173,062, Cl. 29-570.000.

Lodge & Shipley Company, The: *See—*
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Lohmann, Joachim W.: *See—*
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Lolivier, Jacques: *See—*
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Lombard, Daniel L. Unmanned chain hook-up for lifting loose bundles. 4,173,334, Cl. 294-67.00E.

Long, David T.: *See*—
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Long, Robert, to Ecodyne Corporation. Liquid cooling tower. 4,173,605, Cl. 261-109.000.

Lonstrup, Thor F.; Brownawell, Darrell W.; and Howlett, Barry J., to Exxon Research & Engineering Co. Lubricating oil composition containing a dispersing-varnish inhibiting combination of polyol ester compound and a borated acyl nitrogen compound. 4,173,540, Cl. 252-49.600.

Lord Corporation: *See*—
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Louis, Emma D. Window shade controls and method associated therewith. 4,173,721, Cl. 307-115.000.

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Lucke Apparatebau GmbH: *See*—
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Lucke, Florian, to Lucke Apparatebau GmbH. Device for cutting yarn on ball winding machines. 4,173,311, Cl. 242-2.000.

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Lundborg, Charles L.: *See*—
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Lynch, Thomas J.: *See*—
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M&T Chemicals Inc.: *See*—
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MacAnally, Richard B.: *See*—
Ekinaka, Michael H.; and MacAnally, Richard B., 4,173,392, Cl. 350-96.260.

MacBroom, James, Jr., to Toolmatic Corporation of Connecticut. Cannula grinding cartridge and fixture. 4,173,100, Cl. 51-227.00H.

Macdonald, Kenneth A. B., to United States of America, Air Force. Flutter prevention means for aircraft primary flight control surfaces. 4,173,322, Cl. 244-75.00A.

Madrange nee Dermain, Annie; de Montalembert, Henri M.; Meurice, Pierre; and Refregier, Jean-Louis, to L'Oreal. Hair lacquer sprays having reduced inflammability. 4,173,627, Cl. 424-47.000.

Maeda, Ikuo: *See*—
Horike, Masanori; Shibata, Isamu; and Maeda, Ikuo, 4,173,402, Cl. 354-25.000.

Maeda, Takeo: *See*—
Morinaga, Shigeki; Maeda, Takeo; Takahashi, Tadashi; and Ishizaki, Kosho, 4,173,193, Cl. 112-275.000.

Maeda, Takuma: *See*—
Shimizu, Kazushige; and Maeda, Takuma, 4,173,061, Cl. 29-403.200.

Magnesium Elektron Limited: *See*—
Unsworth, William; King, John F.; and Bradshaw, Stephen L., 4,173,469, Cl. 75-168.00F.

Maguire, Phillip: *See*—
Cheetham, Colin J.; and Maguire, Phillip, 4,173,486, Cl. 106-99.000.

Maier, Roland; Woitun, Eberhard; Reuter, Wolfgang; Wetzel, Bernd; Goeth, Hanns; and Lechner, Uwe, to Boehringer Ingelheim GmbH. 4-Spectinomycylamine and salts thereof. 4,173,647, Cl. 424-283.000.

Main, Ralph M.; and Paramonoff, Elpidifor, to Standun, Inc. Can bodymaker having improved ram support and drive. 4,173,138, Cl. 72-349.000.

Mainzer, Franz: *See*—
Krause, Johannes; Reichert, Gunter; Mainzer, Franz; and Niermann, Hermann, 4,173,621, Cl. 423-303.000.

Majaniemi, Pekka: *See*—
Holkko, Seppo; Lehtinen, Jukka; and Majaniemi, Pekka, 4,173,249, Cl. 162-360.00R.

Maksimovic, Slavoljub D.: *See*—
Kissell, Fred N.; Maksimovic, Slavoljub D.; and Matta, Joseph E., 4,173,141, Cl. 73-40.700.

Mal, M. Kumar; and Tarkan, Stuart E., to Chromalloy American Corporation. Age-hardenable titanium carbide tool steel. 4,173,471, Cl. 75-237.000.

Malacheski, Joseph J.; and Zenda, Richard J. Valved closure for a pressure vessel. 4,173,292, Cl. 220-303.000.

Mannesmann Aktiengesellschaft: *See*—
Goldschmidt, Rolf; Hansgen, Klaus; Hiersig, Heinz M.; and Kirstenpfad, Fritz, 4,173,330, Cl. 254-98.000.

Mannheim, Jose R. Decorated safety glass. 4,173,672, Cl. 428-203.000.

March, Joseph E., to Platt Luggage, Inc. Hinged tray assembly. 4,173,284, Cl. 206-349.000.

Mars Limited: *See*—
Heslop, Philip J.; and Matthews, Roger J., 4,173,377, Cl. 312-29.000.

Marshall, William A., to Alco Foodservice Equipment Company. Apparatus for mixing and dispensing a beverage. 4,173,296, Cl. 222-129.100.

Martin, Jerry R.: *See*—
Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, 4,173,564, Cl. 260-112.50R.

Marto, John H.: *See*—
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Marvin Glass & Associates: *See*—
Meyer, Burton C.; and Jaworski, Eugene, 4,173,096, Cl. 46-205.000.

Marx, Alvin J.; and Edelman, Abraham, to Marx, Alvin J. Automated intravenous fluid regulating and administering apparatus. 4,173,224, Cl. 128-214.00E.

Masaki, Kenji, to Nissan Motor Co., Ltd. Electrostatic fuel injector. 4,173,206, Cl. 123-119.00E.

Maschinenfabrik J. Dieffenbacher GmbH & Co.: *See*—
Pfeiffer, Heinrich; and Brussel, Richard, 4,173,275, Cl. 198-421.000.

Maschinenfabrik Walter Scheele KG: *See*—
Bille, Heinz, 4,173,436, Cl. 417-516.000.

Massaro, Anthony A., Jr.; and Andrews, Harry N., to Westinghouse Electric Corp. System and method for retubing a steam generator. 4,173,060, Cl. 29-157.400.

Massengeil, Hans A.; Stemme, Otto; Eppe, Rudolf; Pfeifer, Josef; Konigl, Georg; and Schatz, Anton, to AGFA-Gevaert, A.G. Exposure system for copying machines. 4,173,411, Cl. 355-50.000.

Mathey, Francois; and Bensoam, Jean, to Institute National de Recherche Chimique Appliquee. Process for producing fluorinated organic compounds containing a difluoromethylene group from compounds comprising at least one carbonyl function. 4,173,706, Cl. 560-30.000.

Matsch, Ladislas C.; and Drnevich, Raymond F., to Union Carbide Corporation. Nitrification-denitrification of wastewater. 4,173,531, Cl. 210-5.000.

Matsuda, Yasumasa: *See*—
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Matsunami, Muneharu: *See*—
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Matsuo, Takashi: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
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Matsushita Electric Works, Ltd.: *See*—
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Matta, Joseph E.: *See*—
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Mattei, Jean-Pierre; and Coutin, Pierre F., to R. Alkan & Cie. Device for jettisoning a load in two different ways. 4,173,366, Cl. 294-83.00R.

Matthews, Roger J.: *See*—
Heslop, Philip J.; and Matthews, Roger J., 4,173,377, Cl. 312-29.000.

Matthies, Alfred: *See*—
Turini, Gerhard; and Matthies, Alfred, 4,173,301, Cl. 226-102.000.

Maurer, Robert D., to Corning Glass Works. Optical waveguide with protective coating. 4,173,393, Cl. 350-96.340.

Maxson, Myron T.: *See*—
Homan, Gary R.; Maxson, Myron T.; and Toporcer, Louis H., 4,173,560, Cl. 260-37.0SB.

McCall, Richard H., to Texaco Inc. Surface fluid collector. 4,173,536, Cl. 210-242.00S.

McConnell, Richard L.: *See*—
Vachon, Raymond N.; and McConnell, Richard L., 4,173,680, Cl. 428-375.000.

McDonnell Douglas Corporation: *See*—
Aldridge, Clifton; Gibson, Sandra F.; Vannest, Richard D.; and Rodgers, Gregory D., 4,173,515, Cl. 435-38.000.

McFerren, John S.: *See*—
Johnson, Elwin L.; Kilby, Jack S.; Lathrop, Jay W.; McFerren, John S.; and Myers, David J., 4,173,494, Cl. 136-89.0TF.

McGann, Rodney: *See*—
Paull, Peter L.; and McGann, Rodney, 4,173,254, Cl. 165-134.00R.

McGlen, James A.: *See*—
Swapceinski, John P.; Hilbert, Thomas K.; and McGlen, James A., 4,173,405, Cl. 355-3.0DD.

McKaveney, James P.; and Prieto, Martin A., to Occidental Research Corporation. Current generating cell with alloy anode. 4,173,687, Cl. 429-218.000.

McKelvey, James M.; and Steingiser, Samuel, to Monsanto Company. Plastics extrusion apparatus. 4,173,445, Cl. 425-376.00A.

McLaughlin, Charles S. Marine cleat for receiving a thrown line. 4,173,194, Cl. 114-218.000.

McLaughlin, John R.; Bryant, Michael D.; Fessel, Manfred; and Taylor, Kenneth C., to Foseco International Limited. Magnesium-containing treatment agents. 4,173,466, Cl. 75-58.000.

McLaughlin, Richard J.; and Rogozinski, Wallace J., to Rogozinski, Wallace. EKG cable monitoring system. 4,173,221, Cl. 128-696.000.

McRae, Wayne A., to Ionics Inc. Chlor-alkali electrolysis cell. 4,173,524, Cl. 204-265.000.

Mead Corporation, The: *See—*
Stolfo, John J., 4,173,684, Cl. 428-531.000.

Medina, Alejandro: *See—*
Castelazo, Garbiel G. M.; Quintero, Abraham; Medina, Alejandro; and Fabila, Gilberto, 4,173,598, Cl. 428-402.000.

Meeks, Frederick T., to General Electric Company. Digital weighing scale. 4,173,263, Cl. 177-210.0EM.

Mehta, Gunvant N.: *See—*
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Meier, Joseph F.; Rudd, George E.; Pradhan, Ashok V.; George, John A.; Lippincott, Hugh W.; and Sutherland, John D., to Westinghouse Electric Corp. Shock absorber system for nuclear reactor ice condenser compartment. 4,173,512, Cl. 176-37.000.

Meiners, Elmo R., to M & W Gear Company. Apparatus for wrapping a cover material around round bales. 4,173,112, Cl. 56-341.000.

Meissner, David C.; and Sanzenbacher, Charles W., to Midrex Corporation. Method for the direct reduction of iron using gas from coal. 4,173,465, Cl. 75-35.000.

Melton, David T.: *See—*
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Merchant, Floyd S. Contact fault detector. 4,173,735, Cl. 324-421.000.

Mercier, George E., to Westinghouse Electric Corp. Power capacitor with an internal support structure. 4,173,776, Cl. 361-272.000.

Merck & Co., Inc.: *See—*
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Dempski, Robert E.; Mehta, Gunvant N.; and Saboe, Joseph C., 4,173,626, Cl. 424-19.000.
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Shepard, Kenneth L.; and Paleveda, William J., Jr., 4,173,646, Cl. 424-270.000.

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Metivier, Jean; and Sauli, Michel, to Rhone-Poulenc S.A. Process for the preparation of dextrorotatory 2-phenoxypropionic acid derivatives. 4,173,709, Cl. 562-471.000.

Metje, Heinz. Bending fixture for offset plates. 4,173,137, Cl. 72-320.000.

Meurice, Pierre: *See—*
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Meyer, Burton C.; and Jaworski, Eugene, to Marvin Glass & Associates. Wheeled toy. 4,173,096, Cl. 46-205.000.

Midori Anzen Company, Ltd.: *See—*
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Midrex Corporation: *See—*
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Millard, Maurice; Peters, David L.; Trzeciak, John R.; and Woycechowsky, Brian J., to Singer Company, The. Video generator for use in a synthetic terrain generator. 4,173,081, Cl. 35-12.00N.

Miller, Donald M.; and Webb, Grant A., to Teleflex Incorporated. Motion transmitting remote control assembly. 4,173,157, Cl. 74-501.00R.

Miller, Howard E.: *See—*
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Mims, Herman D. Carton erector. 4,173,173, Cl. 93-51.00R.

Mimura, Akio; Suzuki, Takaya; and Yagiyu, Seturo, to Hitachi, Ltd. Dielectric insulator separated substrate for semiconductor integrated circuits. 4,173,674, Cl. 428-220.000.

Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, to Argus Chemical Corporation. 2,2,6,6-Tetraalkyl-4-piperidyl ketones and ketals as stabilizers for synthetic polymers. 4,173,599, Cl. 525-66.000.

Mine, Akihiko: *See—*
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Mine, Kiyomitsu: *See—*
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Minhas, Pritam S.; and Sukornick, Bernard, to Allied Chemical Corporation. Flame retardant carpet and method for preparing same. 4,173,671, Cl. 428-85.000.

Minnesota Mining and Manufacturing Company: *See—*
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Smith, George H.; and Olofson, Peter M., 4,173,476, Cl. 430-280.000.

Minnicks, Paul, III. Radio navigation training device. 4,173,080, Cl. 35-10.250.

Minolta Camera Kabushiki Kaisha: *See—*
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Ueda, Hiroshi; Oyokota, Shigeru; and Kajita, Hideo, 4,173,403, Cl. 354-152.000.

Mira-Pak Inc.: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,173,106, Cl. 53-449.000.

Mitchell, James: *See—*
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Mitsubishi Chemical Industries Ltd.: *See—*
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Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,173,630, Cl. 424-177.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
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Mitsubishi Rayon Co., Limited: *See—*
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Mitsui Toatsu Chemicals, Incorporated: *See—*
Otsuka, Eiji; Inoue, Shigeru; Kimura, Tetsuo; Takae, Toshinori; Tsuji, Morio; and Kato, Toshiki, 4,173,615, Cl. 422-197.000.

Mitsuno, Tatsuyuki: *See—*
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Miura, Haruhisa, to Tokyo Shibaura Electric Co., Ltd. Multiplication control system. 4,173,789, Cl. 364-760.000.

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Mohri, Hiroshi: *See—*
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Molt, Kenneth R., to Cincinnati Milacron Chemicals Inc. Polynuclear hindered phenols and stabilizing organic materials containing the phenols. 4,173,541, Cl. 252-52.00R.

Monarch Marking Systems, Inc.: *See—*
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Hamisch, Paul H., Jr.; and Hubbard, David W., 4,173,293, Cl. 221-1.000.

Monsanto Company: *See—*
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Coran, Aubert Y.; and Patel, Raman P., 4,173,556, Cl. 260-30.80R.
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Moore Business Forms, Inc.: *See—*
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Moore, Harold, Jr., to Reserve Oil, Inc. Downhole pump. 4,173,451, Cl. 417-457.000.

Moran, Paul R.: *See—*
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Mori, Kinya: *See—*
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Mori, Tatsuo: *See—*
Kobayashi, Seishichi; Mori, Tatsuo; and Ueno, Hiroshi, 4,173,290, Cl. 220-75.000.

Morinaga, Shigeki; Maeda, Takeo; Takahashi, Tadashi; and Ishizaki, Kosho, to Hitachi, Ltd. Controlling apparatus for electric sewing machine. 4,173,193, Cl. 112-275.000.

Morrell, Albert M.: *See—*
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Morrison, Douglas I.: *See—*
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Mortensen, Donald G.; and Browning, James T., to FMC Corporation. Root crop harvester. 4,173,257, Cl. 171-33.000.

Morton, Edward W.: *See—*
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Motoren- und Turbinen-Union Munchen GmbH: *See—*
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Motta, Vincent C.: *See—*
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Moynihan, Daniel J.: *See—*
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Mrozik, Helmut H.: *See—*
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Mscan Metal Canada Limitee: *See—*
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Muetterties, Andrew J., to Abbott Laboratories. Apparatus for controllably administering a parenteral fluid. 4,173,222, Cl. 128-214.00C.

Muller, Friedhelm: *See—*
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Murakami, Atsushi: *See—*
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Muramoto, Takayoshi; and Orita, Kunitaka, to Fumakilla Limited. Method for killing insects and/or fungi with electro-mechanical ultrasonic nebulizer and composition for said method. 4,173,651, Cl. 424-306.000.

Murata, Kosaku; Takayama, Satoshi; and Niguchi, Hirotoshi, to Matsushita Electric Industrial Co., Ltd. Speaker diaphragm molded from poly-biphenol phthalate type resin film. 4,173,701, Cl. 528-194.000.

Murata, Masahiro, to Hope Co., Ltd. Ski braking device. 4,173,354, Cl. 280-605.000.

Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., to International Flavors & Fragrances Inc. C_{10}-terpene alkyl, alkenyl, haloalkyl, and alkynyl ethers and diethers, processes for preparing same and organoleptic uses thereof. 4,173,543, Cl. 252-174.110.

Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., to International Flavors & Fragrances Inc. 3-(2-Chloroallyloxy)-2(10)-pinene. 4,173,711, Cl. 568-665.000.

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Nachman Corporation: *See—*
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Nagao, Kenichi: *See—*
Hirasawa, Masataka; Hashimoto, Akira; Nagao, Kenichi; and Kobayashi, Toshiaki, 4,173,734, Cl. 323-8.000.

Nagarajan, Ramakrishnan: *See—*
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Nagata, Yuuichi; and Matsuoka, Tadataka, to Nippon Gakki Seizo Kabushiki Kaisha. Speaker protection circuit. 4,173,740, Cl. 330-298.000.

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Nakai, Tadanobu, to Tokiwa Chemical Industries Limited. Rat capturing device. 4,173,092, Cl. 43-61.000.

Nakai, Tadanobu, to Tokiwa Chemical Industries Limited. Cockroach catching device. 4,173,093, Cl. 43-121.000.

Nakajima, Tomio: *See—*
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Nakajima, Yasuo; Onoda, Michio; Sugihara, Kunihiko; and Nagumo, Shinichi, to Nissan Motor Co., Ltd. Engine system. 4,173,203, Cl. 123-119.00A.

Nakamatsu, Shuji; Harada, Hiroyuki; Shinomiya, Yoshitugu; and Omizu, Tuyoshi, to Chlorine Engineers Corp., Ltd. Electrolytic cell for electrolysis of sea water. 4,173,525, Cl. 204-275.000.

Nakamura, Isao: *See—*
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Nakano, Shiro; and Hotta, Masahiro, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Electro-thermosensitive recording materials. 4,173,677, Cl. 428-335.000.

Nakashima, Hiromasa, to NGK Insulators, Ltd. Filter cloth washing device for filter press. 4,173,535, Cl. 210-225.000.

Nakayama, Shinpei: *See—*
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Nalco Chemical Company: *See—*
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Napier, Loyd S. Bow string release device. 4,173,210, Cl. 124-35.00A.

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Nauman, Edward F.: *See—*
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Neale, Frank T., III, to General Motors Corporation. Connector interface sealing arrangement. 4,173,349, Cl. 277-6.000.

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Katona, Tibor; Kenderesy, Tamas; Nemes, Imre; Erdelyi, Agoston; and Ragalyi, Jozsef, 4,173,787, Cl. 364-550.000.

Nesti, Gian P., to Campisusa S.P.A. Steel wire stackable upsettable-wall container. 4,173,289, Cl. 220-7.000.

New York Institute of Technology: *See—*
Schure, Alexander; and Glenn, William E., 4,173,391, Cl. 350-96.250.

Newhart, Earle E., deceased; and by Newhart, Ruth, executor. Integral artificial kidney unit. 4,173,537, Cl. 210-321.00B.

Newhart, Ruth, executor: *See—*
Newhart, Earle E., deceased; and Newhart, Ruth, executor, 4,173,537, Cl. 210-321.00B.

Newman, Howard F.; and Stansbury, Benjamin, to American Hospital Supply Corporation. Hand measuring device. 4,173,074, Cl. 33-2.00R.

Newman, Howard F., to American Hospital Supply Corporation. Adjustable stop for dispensing syringe. 4,173,225, Cl. 128-218.00C.

NGK Insulators, Ltd.: *See—*
Nakashima, Hiromasa, 4,173,535, Cl. 210-225.000.

NGK Spark Plug Co., Ltd.: *See—*
Takagi, Shunichi; and Fukuoka, Masaru, 4,173,731, Cl. 315-58.000.

Nichols, Wallace H., Jr. Method for treating ground surfaces with a toxic agent. 4,173,094, Cl. 43-129.000.

Nida, Roy J. Method of rustproofing motor vehicles. 4,173,665, Cl. 427-421.000.

Niermann, Hermann: *See—*
Krause, Johannes; Reichert, Gunter; Mainzer, Franz; and Niermann, Hermann, 4,173,621, Cl. 423-303.000.

Niguchi, Hirotoshi: *See—*
Murata, Kosaku; Takayama, Satoshi; and Niguchi, Hirotoshi, 4,173,701, Cl. 528-194.000.

Niida, Chiaki: *See—*
Takayama, Teruo; Yamada, Kinsaku; and Niida, Chiaki, 4,173,204, Cl. 123-119.00A.

Nippon Dyeing Machine Mfg. Co., Ltd.: *See—*
Sugimoto, Isao, 4,173,132, Cl. 68-189.000.

Nippon Electric Co., Ltd.: *See—*
Iijima, Yukihiko, 4,173,771, Cl. 358-135.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Adachi, Takeshi; Koike, Masahiko; and Takahashi, Toshiyuki, 4,173,164, Cl. 84-1.190.
Nagata, Yuuichi; and Matsuoka, Tadataka, 4,173,740, Cl. 330-298.000.

Nippon Kogaku K.K.: *See—*
Akasaka, Shigeo, 4,173,404, Cl. 354-289.000.

Nippon Telegraph and Telephone Public Corporation: *See—*
Abe, Masahiro; Eifuku, Yoshiaki; and Kajiwara, Toshio, 4,173,790, Cl. 364-900.000.

Nippon Zeon Co., Ltd.: *See—*
Inagami, Masaaki, 4,173,694, Cl. 525-351.000.

Niquette, Joan. Paper for teaching writing skills. 4,173,082, Cl. 35-37.000.

Nishide, Katsuhiko: *See—*
Tanaka, Takashi; and Nishide, Katsuhiko, 4,173,474, Cl. 430-1.000.

Nishihara, Motohisa: *See—*
Yamada, Kazuji; Sato, Hideo; Okayama, Tsutomu; Nishihara, Motohisa; Matsuoka, Yoshitaka; Katohgi, Katsuya; Matsuda, Yasumasa; and Shimada, Satoshi, 4,173,148, Cl. 73-766.000.

Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; Yamamoto, Toshihiko, deceased; and by Yamamoto, Hikotaro, legal representative, to Ishihara Sangyo Kaisha Ltd. N-Benzoyl-N'-pyridyloxy phenyl urea and insecticidal compositions thereof. 4,173,637, Cl. 424-263.000.

Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; and Yamamoto, Toshihiko, to Ishihara Sangyo Kaisha Ltd. N-Benzoyl-N'-pyridyloxy phenyl urea and insecticidal compositions thereof. 4,173,638, Cl. 424-263.000.

Nissan Motor Co., Ltd.: *See—*
Masaki, Kenji, 4,173,206, Cl. 123-119.00E.
Nakajima, Yasuo; Onoda, Michio; Sugihara, Kunihiko; and Nagumo, Shinichi, 4,173,203, Cl. 123-119.00A.
Sakaki, Yoshihiro; and Eishima, Kensuke, 4,173,252, Cl. 165-9.000.

Nissen, Axel: *See—*
Pasedach, Heinrich; Mohr, Rudolf; and Nissen, Axel, 4,173,588, Cl. 260-595.000.

Nitta, Tatsuo: *See—*
Takahashi, Kazutoshi; Nitta, Tatsuo; and Iwakura, Ryoji, 4,173,117, Cl. 58-85.500.

Noda, Hideo, to Shimano Industrial Company, Limited. Fishing reel. 4,173,316, Cl. 242-84.20R.

Noguchi, Hiroshi; Hashimoto, Shunichi; Kitamura, Shigeyoshi; Matsuo, Takashi; Mine, Akihiko; and Kamoshita, Katsuzo, to Sumitomo Chemical Company, Limited. m-Phenoxybenzamide derivatives. 4,173,464, Cl. 71-118.000.

Nolet, Roland. Massage device. 4,173,216, Cl. 128-24.100.

Nolte, Hans-Henning: *See—*
Hentzelt, Walther E.; Nolte, Hans-Henning; and von Reis, Wolf, 4,173,668, Cl. 428-34.000.

Noomen, Arie; van der Geest, Johannes M. P.; de Jong, Cornelis; and Van Santen, Dick, to Akzo N.V. Process for coating a substrate with

a radiation and moisture curable coating composition. 4,173,682, Cl. 428-423.000.
Norfin, Inc.: *See—*
Snellman, Donald L.; and Hudson, Willard G., 4,173,113, Cl. 57-249.000.
Norris, Alan H.: *See—*
Chambley, Phillip W.; and Norris, Alan H., 4,173,115, Cl. 57-293.000.
Norris, Floyd E., to Reynolds, Gary; and Tai, Harold Y. Dental chair. 4,173,372, Cl. 297-345.000.
Nose, Hisakichi: *See—*
Isino, Koichi; and Nose, Hisakichi, 4,173,231, Cl. 132-9.000.
Novinski, Norbert L., II: *See—*
Richardson, J. Mark; and Novinski, Norbert L., II, 4,173,623, Cl. 423-494.000.
Nu-Watt, Inc.: *See—*
Smith, Roland L., 4,173,431, Cl. 417-229.000.
Nunlist, Erwin J.; and Mitchell, James, to Sybron Corporation. Feed distributor for glassed steel wiped film evaporator. 4,173,246, Cl. 159-6.00W.
Nussbaum, Hans. Hoist mechanism. 4,173,268, Cl. 187-8.490.
N.V. Optische Industrie "De Oude Delft": *See—*
Geluk, Ronald J., 4,173,720, Cl. 250-445.00T.
Obermeyer, Franklin D.; and Berringer, Robert T., to Westinghouse Electric Corp. Nuclear reactor with control rods. 4,173,513, Cl. 176-50.000.
Occidental Research Corporation: *See—*
McKaveney, James P.; and Prieto, Martin A., 4,173,687, Cl. 429-218.000.
Ogawa, Hisaharu: *See—*
Kawagai, Kenji; Yoshida, Shigeki; Ogawa, Hisaharu; and Ohashi, Toshiro, 4,173,756, Cl. 340-636.000.
Ohashi, Toshiro: *See—*
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Ohkubo, Kazuo: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,173,630, Cl. 424-177.000.
Ohmi, Atsushi, to Aisin Seiki Kabushiki Kaisha. Tandem brake booster. 4,173,172, Cl. 91-369.00A.
Oiles Kogyo Kabushiki Kaisha: *See—*
Kawaguchi, Kenryo, 4,173,500, Cl. 148-16.000.
Okabe, Katsuhiko, to Copal Company Limited. Paper feeding mechanism in a printer. 4,173,420, Cl. 400-618.000.
Okabe, Yukio: *See—*
Watanabe, Yasuaki; and Okabe, Yukio, 4,173,770, Cl. 358-28.000.
Okamoto, Ikuzo; and Shindo, Osamu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Optical system for objective eye-examination. 4,173,398, Cl. 351-9.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, to Mitsubishi Chemical Industries Limited; and Okamoto, Shosuke. N^2Arylsulfonyl-L-argininamides and the pharmaceutically acceptable salts thereof. 4,173,630, Cl. 424-177.000.
Okamoto, Takashi: *See—*
Asami, Kazuto; and Okamoto, Takashi, 4,173,232, Cl. 133-3.00R.
Okayama, Tsutomu: *See—*
Yamada, Kazuji; Sato, Hideo; Okayama, Tsutomu; Nishihara, Motohisa; Matsuoka, Yoshitaka; Katohgi, Katsuya; Matsuda, Yasumasa; and Shimada, Satoshi, 4,173,148, Cl. 73-766.000.
Oklahoma Agricultural and Mechanical Colleges, The Board of Regents for the: *See—*
Whitcomb, Carl E., 4,173,212, Cl. 126-430.000.
Okonowski, Richard L. Baseball batting and pitching apparatus. 4,173,337, Cl. 273-26.00A.
Oldendorf, Manfred: *See—*
Balon, Johannes; and Oldendorf, Manfred, 4,173,182, Cl. 101-4.000.
Olliges, William E., to Gerstman, George H. Amusement device using perforated board. 4,173,341, Cl. 273-126.00A.
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Smith, George H.; and Olofson, Peter M., 4,173,476, Cl. 430-280.000.
Olsen, Wayne A.; and Tigner, Calvin L. Birdhouse construction. 4,173,200, Cl. 119-23.000.
Olympus Optical Co., Ltd.: *See—*
Satoh, Ken, 4,173,773, Cl. 360-67.000.
Tsuda, Naotsune, 4,173,065, Cl. 29-603.000.
Omizu, Tuyoshi: *See—*
Nakamatsu, Shuji; Harada, Hiroyuki; Shinomiya, Yoshitugu; and Omizu, Tuyoshi, 4,173,525, Cl. 204-275.000.
Ondetti, Miquel A.; and Cushman, David W., to E. R. Squibb & Sons, Inc. Dithio aminoacid derivatives. 4,173,704, Cl. 548-336.000.
Onoda, Michio: *See—*
Nakajima, Yasuo; Onoda, Michio; Sugihara, Kunihiko; and Nagumo, Shinichi, 4,173,203, Cl. 123-119.00A.
Onopchenko, Anatoli: *See—*
Schulz, Johann G. D.; and Onopchenko, Anatoli, 4,173,573, Cl. 260-346.400.
Optical Coating Laboratory, Inc.: *See—*
Snavely, Carol J.; Lewin, Ian; and Small, Edward A., Jr., 4,173,778, Cl. 362-297.000.
O'Rell, Michael K.: *See—*
Green, Howard E.; Jones, Robert J.; and O'Rell, Michael K., 4,173,700, Cl. 528-125.000.
Orita, Kunitaka: *See—*
Muramoto, Takayoshi; and Orita, Kunitaka, 4,173,651, Cl. 424-306.000.
Osborn, L. Earl. Combination sofa and bed. 4,173,045, Cl. 5-12.00R.
Osman, Maged A., to BBC Brown Boveri & Company Limited. Novel alkylsubstituted N-benzylideneanilines and liquid crystal compositions containing same. 4,173,544, Cl. 252-299.000.
Oster, Francine: *See—*
Gager, John C., 4,173,072, Cl. 433-120.000.
Oswald, Alexis A.: *See—*
Brenner, Douglas; and Oswald, Alexis A., 4,173,695, Cl. 526-332.000.
Ota, Etsuji. Drain valve operating device for a cistern of flush toilet. 4,173,044, Cl. 4-325.000.
Otis Engineering Corporation: *See—*
Kilgore, Marion D., 4,173,256, Cl. 166-324.000.
Otisca Industries, Ltd.: *See—*
Smith, Clay D.; and Keller, Douglas V., Jr., 4,173,530, Cl. 209-9.000.
Otsuka, Eiji; Inoue, Shigeru; Kimura, Tetsuo; Takae, Toshinori; Tsuji, Morio; and Kato, Toshiki, to Mitsui Toatsu Chemicals, Incorporated. Chemical apparatus for corrosive materials. 4,173,615, Cl. 422-197.000.
Otsuka Kagaku Yakuhin Kabushiki Kaisha: *See—*
Torii, Sigeru; Tanaka, Hideo; and Kobayashi, Yuichi, 4,173,707, Cl. 560-122.000.
Ottlik, Peter: *See—*
Kubovits, Imre; Meszaros, Imre; Kaszatnitzky, Ferenc; Szabo, Mrs. Laszlo; and Ottlik, Peter, 4,173,484, Cl. 106-39.600.
Owens-Illinois, Inc.: *See—*
Boling, Norman L.; and Dube, George, 4,173,738, Cl. 330-4.300.
Rapp, Charles F.; and Boling, Norman L., 4,173,495, Cl. 136-89.0PC.
Oxenreider, Terry R., to General Battery Corporation. Cast on mold inserts. 4,173,326, Cl. 249-83.000.
Oy Tampella AB: *See—*
Holkko, Seppo; Lehtinen, Jukka; and Majaniemi, Pekka, 4,173,249, Cl. 162-360.00R.
Oyama, Kenjiro; and Imaizumi, Koji, to Minolta Camera Kabushiki Kaisha. Electrical charge removing arrangement for removing charge from non-image bearing portions of photo-sensitive medium. 4,173,406, Cl. 355-3.00R.
Oyokota, Shigeru: *See—*
Ueda, Hiroshi; Oyokota, Shigeru; and Kajita, Hideo, 4,173,403, Cl. 354-152.000.
Paleveda, William J., Jr.: *See—*
Shepard, Kenneth L.; and Paleveda, William J., Jr., 4,173,646, Cl. 424-270.000.
Palmer, Louis R.; and Karo, James T., to Allied Chemical Corporation. Purification of 4,4'-benzophenonedicarboxylic acid. 4,173,708, Cl. 562-460.000.
Paradis, Roland C.: *See—*
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Paramonoff, Elpidifor: *See—*
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Paris Manufacturing Company, Inc.: *See—*
Sanko, John R., 4,173,300, Cl. 223-70.000.
Park Mobile, Inc.: *See—*
Lichti, Robert D.; and Herrera, Joseph O. (said Joseph O. Herrera and Paul J. Ashley assors. to), 4,173,279, Cl. 198-500.000.
Parker, Trent J.; and Dawson, Harmel A. Method, process, system, and apparatus for recovering metal values from ores. 4,173,519, Cl. 204-110.000.
Pasedach, Heinrich; Mohr, Rudolf; and Nissen, Axel, to BASF Aktiengesellschaft. Manufacture of 2-methyl-2-hepten-6-one. 4,173,588, Cl. 260-595.000.
Patel, Raman P.: *See—*
Coran, Aubert Y.; and Patel, Raman P., 4,173,556, Cl. 260-30.80R.
Patelhold Patentverwertungs- & Electro-Holding AG: *See—*
Kach, Alfred, 4,173,390, Cl. 350-96.160.
Paul Anderson Industrier AB: *See—*
Naslund, Soren, 4,173,331, Cl. 254-105.000.
Paul Hammelmann Maschinenfabrik: *See—*
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Paull, Peter L.; and McGann, Rodney, to Texaco Inc. Partial oxidation process. 4,173,254, Cl. 165-134.00R.
Pauly, Ronald R.; and Rumsey, Royce D., to Tonka Corporation. Toy vehicle. 4,173,095, Cl. 46-201.000.
Payne, Larry W.; Miller, Howard E.; and Ryffel, James R., to Badische Corporation. Process for cleavage of unsaturated multi-cyclic ketones. 4,173,586, Cl. 260-586.00R.
Peabody Coal Company, Inc.: *See—*
Campbell, John A. L.; and Moynihan, Daniel J., 4,173,373, Cl. 299-11.000.
Pearce, Philip D. Coal firing systems for kilns. 4,173,188, Cl. 110-106.000.
Peinado, Fernando R.: *See—*
Jarque, Ricardo G.; Cartes, Juan B.; Jimenez, Rosa L.; Roldan, Cristobal M.; and Peinado, Fernando R., 4,173,705, Cl. 546-283.000.
Pellegata, Renato: *See—*
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Pendergrass, John E.; and Melton, David T., to Kendall Co., The. Porous elastic bandage. 4,173,131, Cl. 66-192.000.

Perego, Giuseppe. Foldable baby carriage with foldable and adjustable foot rest. 4,173,355, Cl. 280-642.000.

Perkin-Elmer Corporation, The: *See*—
Leka, George T.; and Paradis, Roland C., 4,173,437, Cl. 417-521.000.

Perriman, Michael J.: *See*—
Pugsley, Peter C.; and Perriman, Michael J., 4,173,416, Cl. 356-432.000.

Perry, Robert W. Striking equipment for developing martial art skills. 4,173,336, Cl. 272-76.000.

Peters, David L.: *See*—
Millard, Maurice; Peters, David L.; Trzeciak, John R.; and Woycechowsky, Brian J., 4,173,081, Cl. 35-12.00N.

Peterson, James F., to Allis-Chalmers Corporation. Vented grass-catcher cover. 4,173,111, Cl. 56-202.000.

Peterson, Larry W.; Bozarth, Gene A.; and Pilgram, Kurt H. G., to Shell Oil Company. Phosphonium salts as herbicides. 4,173,463, Cl. 71-87.000.

Petropoulos, Constantine C.; Reynolds, George A.; and Van Allan, James A., to Eastman Kodak Company. Radiation sensitive compositions containing pyrylium compounds. 4,173,473, Cl. 430-72.000.

Petrovic, John E., to Teledyne Industries, Inc. Sprayer. 4,173,325, Cl. 248-81.000.

Pettersen, Edward A., to Risdon Manufacturing Company, The. Non-throttling manually reciprocated plunger pump for consumer-type liquid dispensing containers. 4,173,297, Cl. 222-321.000.

Pfeifer, Josef: *See*—
Massengeil, Hans A.; Stemme, Otto; Eppe, Rudolf; Pfeifer, Josef; Konigl, Georg; and Schatz, Anton, 4,173,411, Cl. 355-50.000.

Pfeiffer, Heinrich; and Brussel, Richard, to Maschinenfabrik J. Dieffenbacher GmbH & Co. Device for assembling a plurality of large panel layers into a press pack. 4,173,275, Cl. 198-421.000.

Pfister, Rudolf: *See*—
Sallmann, Alfred; and Pfister, Rudolf, 4,173,577, Cl. 260-500.50H.

Pfizer Inc.: *See*—
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,173,572, Cl. 260-345.90R.
Kraska, Allen R., 4,173,641, Cl. 424-267.000.

Phillips, Kenneth G., to Nalco Chemical Company. Grouting composition containing cupric acrylate. 4,173,555, Cl. 260-29.70H.

Phillips Petroleum Company: *See*—
Larsen, Olaf E., 4,173,446, Cl. 425-380.000.
Willcox, Kenneth W.; and Bailey, Fay W., 4,173,597, Cl. 525-98.000.

Phillips, Raymond J., to United States of America, Navy. Flexible co-axial connector for cable in-line electronics. 4,173,384, Cl. 339-101.000.

Piana, Renato. Chambered element for use in forming a roller screen. 4,173,247, Cl. 160-236.000.

Pickard, George L.: *See*—
Arends, Albert W.; and Pickard, George L., 4,173,161, Cl. 83-278.000.

Pickrell, John W. Trash bin loader and compactor for trash collecting vehicles. 4,173,423, Cl. 414-404.000.

Pifferi, Giorgio; Umani-Ronchi, Achille; Farina, Carlo; and Gamba, Afro, to I.S.F. SpA. 3β-Hydroxy-18β-olean-9-en-30-oic acids. 4,173,648, Cl. 424-294.000.

Pifferi, Giorgio: *See*—
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Pilgram, Kurt H. G.: *See*—
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Pilkington Brothers Limited: *See*—
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Pink, Hans: *See*—
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Pitetti, Raymond C.: *See*—
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Pitney-Bowes, Inc.: *See*—
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Pittsburgh-Des Moines Steel Company: *See*—
Hills, Richard E., 4,173,291, Cl. 220-225.000.

Pizer, Robert S.; and Tryon, Max. Loudspeaker enclosure. 4,173,266, Cl. 181-156.000.

Platt, Earl A.: *See*—
Thomas, David F.; and Platt, Earl A., 4,173,234, Cl. 137-625.470.

Platt Luggage, Inc.: *See*—
March, Joseph E., 4,173,284, Cl. 206-349.000.

Pletcher, Wayne A., to Minnesota Mining and Manufacturing Company. Bonding method utilizing polyester adhesive exhibiting "open time". 4,173,506, Cl. 156-309.000.

Pocklington, Terence W., to Colgate-Palmolive Company. Golf ball. 4,173,345, Cl. 273-217.000.

Pointer, Denver K.: *See*—
Hildebrandt, Jack A.; Pointer, Denver K.; and Stilley, Herschel H., 4,173,501, Cl. 148-16.500.

Polaroid Corporation: *See*—
Faramarzpour, Faramarz, 4,173,400, Cl. 354-27.000.
Kinsman, Gordon F., 4,173,066, Cl. 29-623.100.
Stieger, Frank M., 4,173,058, Cl. 29-148.40D.

Pollard, Edward T. Method of preparing coated pigment particles and the product produced thereby. 4,173,492, Cl. 106-308.00F.

Pomes, Guy: *See*—
Durrieu, Jean-Pierre; and Pomes, Guy, 4,173,681, Cl. 428-409.000.

Pounder, Edwin, to Transdynamics. Low flow rate transducer construction. 4,173,144, Cl. 73-229.000.

Pradhan, Ashok V.: *See*—
Meier, Joseph F.; Rudd, George E.; Pradhan, Ashok V.; George, John A.; Lippincott, Hugh W.; and Sutherland, John D., 4,173,512, Cl. 176-37.000.

Pretzer, Wayne R.: *See*—
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Prieto, Martin A.: *See*—
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Prost, Maurice, to Labaz. Decahydroquinolines, pharmaceutical compositions and methods of use. 4,173,636, Cl. 424-258.000.

Pryor, Harold A.: *See*—
Pryor, Roy R.; and Pryor, Harold A., 4,173,238, Cl. 144-312.000.

Pryor, Roy R.; and Pryor, Harold A. Trimmer methods and apparatus for sawmills. 4,173,238, Cl. 144-312.000.

Puebla, Candido: *See*—
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Pugsley, Peter C.; and Perriman, Michael J., to Crosfield Electronics Limited. Scanning heads for transparencies. 4,173,416, Cl. 356-432.000.

Pulker, Hans K.; and Staffler, Reinhard, to Balzers Patent- und Beteiligungs-Aktiengesellschaft. Method and apparatus for producing carbon coatings by sputtering. 4,173,522, Cl. 204-192.00C.

Pullukat, Thomas J.; Shida, Mitsuzo; and Hoff, Raymond E., to Chemplex Company. Ethylene polymerization catalyst and method. 4,173,548, Cl. 252-430.000.

Purser, Kenneth H., to General Ionex Corporation. Electrical circuit component protecting device. 4,173,712, Cl. 174-35.00R.

Putz, A. Frank. Rotary piston device which displaces fluid in inner and outer variable volume chambers simultaneously. 4,173,438, Cl. 418-59.000.

Quintero, Abraham: *See*—
Castelazo, Garbiel G. M.; Quintero, Abraham; Medina, Alejandro; and Fabila, Gilberto, 4,173,598, Cl. 428-402.000.

Quinto, Mario J. Flame resistant cellulose fiber insulation and process of preparing it. 4,173,666, Cl. 427-427.000.

R. Alkan & Cie.: *See*—
Mattei, Jean-Pierre; and Coutin, Pierre F., 4,173,366, Cl. 294-83.00R.

Raabe, Ralph C.; Cleffman, Roger G.; and Stratton, Raymond G., to Bandag Incorporated. Apparatus for splicing tread strips. 4,173,509, Cl. 156-507.000.

Rademachers, Jakob; and Linde, Gunter, to Bayer Aktiengesellschaft. Recovery of sodium sulphate in production of iron oxide black pigments. 4,173,624, Cl. 423-551.000.

Ragalyi, Jozsef: *See*—
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Raines, Kenneth C.; and LeFevre, Robert J., to National Patent Development Corporation. Chamber assembly for infusion and transfusion apparatus. 4,173,223, Cl. 128-214.00C.

Ralston Purina Company: *See*—
Gaudio, E. Lorna; and Holt, S. Kent, 4,173,657, Cl. 426-574.000.

Ramirez, Peter R.: *See*—
Rotenberg, Don H.; Cuffe, Patricia M.; Laurin, Bernard L.; and Ramirez, Peter R., 4,173,490, Cl. 106-287.140.

Ramsay, Melvin M.; and Wright, Stephen, to International Standard Electric Corporation. Strain measurement. 4,173,412, Cl. 356-33.000.

Ranz, Erwin; Lohmann, Joachim W.; and Schutz, Heinz-Dieter, to AGFA-Gevaert, A.G. Color photographic recording material. 4,173,479, Cl. 430-507.000.

Rapp, Charles F.; and Boling, Norman L., to Owens-Illinois, Inc. Solar collector structures containing thin film polysiloxane, and solar cells. 4,173,495, Cl. 136-89.0PC.

Ratz, Thomas J.; and Baker, Ralph L., to Midori Anzen Company, Ltd. Facemask. 4,173,220, Cl. 128-142.700.

Raudat, John L.; Johnson, Lloyd D.; and Rydell, Adam Z., to Standard-Knapp, Inc. Apparatus for detecting and clearing a jam of articles. 4,173,276, Cl. 198-437.000.

RCA Corporation: *See*—
Arntsen, Arnt P., 4,173,743, Cl. 333-32.000.
Comizzoli, Robert B., 4,173,683, Cl. 428-447.000.
Denlinger, Edgar J.; and Veloric, Harold S., 4,173,768, Cl. 357-68.000.
Dholakia, Anil R., 4,173,348, Cl. 274-47.000.
Lehmann, William L., 4,173,742, Cl. 333-100.000.
Stone, Robert P.; and Morrell, Albert M., 4,173,729, Cl. 313-403.000.

Rees, Herbert; and Schad, Robert D., to Husky Injection Molding Systems. Actuating mechanism for gate valve of injection nozzle. 4,173,448, Cl. 425-549.000.

Refregier, Jean-Louis: *See*—
Madrange nee Dermain, Annie; de Montalembert, Henri M.; Meurice, Pierre; and Refregier, Jean-Louis, 4,173,627, Cl. 424-47.000.

Reiche, Robert F., to Chicago Bridge & Iron Company. Method of and apparatus for controlling the flow of materials from a rotating drum. 4,173,239, Cl. 144-311.000.
Reichert, Gunter: *See*—
Krause, Johannes; Reichert, Gunter; Mainzer, Franz; and Niermann, Hermann, 4,173,621, Cl. 423-303.000.
Reid, Joyce: *See*—
Hauck, Frederic P.; Condon, Michael E.; and Reid, Joyce, 4,173,640, Cl. 424-267.000.
Reid, Joyce P. Vegetable washer. 4,173,051, Cl. 15-3.120.
Reifel, Charles: *See*—
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,173,106, Cl. 53-449.000.
Reighter, David H.: *See*—
Giessner, Bernard G.; Reighter, David H.; and Stringfellow, Allen E., 4,173,690, Cl. 521-89.000.
Reiland, Peter M. Bacon cooking apparatus. 4,173,180, Cl. 99-391.000.
Reilor Limited: *See*—
Robb, Donald, 4,173,099, Cl. 49-168.000.
Reitter, Erwin, to Remington Arms Company, Inc. Transport mechanism for parts. 4,173,278, Cl. 198-461.000.
Remington Arms Company, Inc.: *See*—
Reitter, Erwin, 4,173,278, Cl. 198-461.000.
Resele, Peter; and Leinfellner, Herwig, to Steyr-Daimler-Puch Aktiengesellschaft. Road wheel for motorcycles. 4,173,374, Cl. 301-6.0CS.
Reserve Oil, Inc.: *See*—
Moore, Harold, Jr., 4,173,451, Cl. 417-457.000.
Reuter, Wolfgang: *See*—
Maier, Roland; Woitun, Eberhard; Reuter, Wolfgang; Wetzel, Bernd; Goeth, Hanns; and Lechner, Uwe, 4,173,647, Cl. 424-283.000.
Reynolds, Gary: *See*—
Norris, Floyd E., 4,173,372, Cl. 297-345.000.
Reynolds, George A.: *See*—
Petropoulos, Constantine C.; Reynolds, George A.; and Van Allan, James A., 4,173,473, Cl. 430-72.000.
Rhodes, Mordy M. Fixedly mounted mute for stringed instruments. 4,173,165, Cl. 84-311.000.
Rhone-Poulenc Industries: *See*—
Gruffaz, Max; and Locatelli, Jean-Louis, 4,173,595, Cl. 525-165.000.
Rhone-Poulenc S.A.: *See*—
Metivier, Jean; and Sauli, Michel, 4,173,709, Cl. 562-471.000.
Rhone-Poulenc-Textile: *See*—
Rodier, Henry, 4,173,613, Cl. 264-187.000.
Riba, Jutta. Incandescent lamp monitoring device. 4,173,750, Cl. 340-80.000.
Ricardo & Co., Engineers (1927) Limited: *See*—
Venton-Walters, Roy, 4,173,143, Cl. 73-194.0VS.
Richardson, J. Mark; and Novinski, Norbert L., II, to UOP Inc. Halogenation of lead sulfide. 4,173,623, Cl. 423-494.000.
Richilano, Vincent J., to Zephyr Industries, Inc. Mallet putter. 4,173,343, Cl. 273-169.000.
Richman, Jack: *See*—
Heath, William H.; and Richman, Jack, 4,173,784, Cl. 364-453.000.
Richmond, Jon C.: *See*—
Schmit, David E.; and Richmond, Jon C., 4,173,777, Cl. 362-253.000.
Richter Gedeon Vegyeszeti Gyar Rt: *See*—
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,173,642, Cl. 424-267.000.
Ricoh Company, Ltd.: *See*—
Horike, Masanori; Shibata, Isamu; and Maeda, Ikuo, 4,173,402, Cl. 354-25.000.
Tabata, Yasuhiro; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Kaneko, Tamaki, 4,173,410, Cl. 355-24.000.
Riddell, Inc.: *See*—
Infusino, Ralph J., 4,173,083, Cl. 36-59.00R.
Ridge, David N.: *See*—
Hanifin, John W., Jr.; and Ridge, David N., 4,173,650, Cl. 424-304.000.
Ridgway, H. Curtis, to Telsco Industries, Inc. Rotary sprinkler impact arm spring adjustment. 4,173,306, Cl. 239-230.000.
Riecke, Edgar E.: *See*—
Berwick, Martin A.; and Riecke, Edgar E., 4,173,472, Cl. 430-60.000.
Risdon Manufacturing Company, The: *See*—
Pettersen, Edward A., 4,173,297, Cl. 222-321.000.
Robb, Donald, to Reilor Limited. Pet doors. 4,173,099, Cl. 49-168.000.
Roberts, Floyd E., to Merck & Co., Inc. Preparation of carbamates. 4,173,703, Cl. 544-16.000.
Roberts, Howard M.: *See*—
Hicks, Patrick C.; Benson, Ronald J.; and Roberts, Howard M., 4,173,168, Cl. 84-470.00R.
Roberts, James R., to Eucatex S.A. Industria e Comercio. Medium density, high strength lignocellulose composition board including exhaustively hydrated cellulosic gel binder. 4,173,248, Cl. 162-141.000.
Robertson, James A., to FMC Corporation. Zeolite A crystals of uniformly small particle size and the manufacture thereof. 4,173,622, Cl. 423-329.000.
Robertson, John E.: *See*—
Greenberg, Jacob; and Robertson, John E., 4,173,190, Cl. 110-243.000.
Rockwell International Corporation: *See*—
Saunders, Roger A., 4,173,745, Cl. 333-182.000.
Temes, Gabor C.; and Cheung, Derek T., 4,173,723, Cl. 307-304.000.
Rodgers, Gregory D.: *See*—
Aldridge, Clifton; Gibson, Sandra F.; Vannest, Richard D.; and Rodgers, Gregory D., 4,173,515, Cl. 435-38.000.
Rodier, Henry, to Rhone-Poulenc-Textile. Process for producing cellulosic shaped articles. 4,173,613, Cl. 264-187.000.
Rogers, Edward F.: *See*—
Graham, Donald W.; and Rogers, Edward F., 4,173,631, Cl. 424-180.000.
Rogers, John W. Metal web handling method, apparatus and coil construct. 4,173,313, Cl. 242-56.200.
Roggin, Sam. Protective vehicle partition. 4,173,369, Cl. 296-24.00R.
Rogozinski, Wallace: *See*—
McLaughlin, Richard J.; and Rogozinski, Wallace J., 4,173,221, Cl. 128-696.000.
Rogozinski, Wallace J.: *See*—
McLaughlin, Richard J.; and Rogozinski, Wallace J., 4,173,221, Cl. 128-696.000.
Rohm and Haas Company: *See*—
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Roldan, Cristobal M.: *See*—
Jarque, Ricardo G.; Cartes, Juan B.; Jimenez, Rosa L.; Roldan, Cristobal M.; and Peinado, Fernando R., 4,173,705, Cl. 546-283.000.
Romano, Emanuele, to Wetrifin A.G. Machine for the continuous production of whipped cream. 4,173,126, Cl. 62-306.000.
Rosell, Lloyd J.: *See*—
Hyvarinen, Wayne E.; and Rosell, Lloyd J., 4,173,774, Cl. 361-87.000.
Rosof, Barry H., to Cabot Corporation. Process for recovering valuable metals from superalloy scrap. 4,173,467, Cl. 75-119.000.
Ross, Tsuneyo. Inflatable apparatus and methods of constructing and utilizing same. 4,173,356, Cl. 280-743.000.
Rotenberg, Don H.; Cuffe, Patricia M.; Laurin, Bernard L.; and Ramirez, Peter R., to American Optical Corporation. Coating composition. 4,173,490, Cl. 106-287.140.
Rowatt, Robert J.: *See*—
Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., 4,173,697, Cl. 526-74.000.
Roy E. Roth Company: *See*—
Sieghartner, Leonard J., 4,173,350, Cl. 277-40.000.
Royal Industries, Inc., a subsidiary of Lear Siegler, Inc.: *See*—
Wells, Willis, 4,173,261, Cl. 172-136.000.
Rudd, George E.: *See*—
Meier, Joseph F.; Rudd, George E.; Pradhan, Ashok V.; George, John A.; Lippincott, Hugh W.; and Sutherland, John D., 4,173,512, Cl. 176-37.000.
Rudmann, Arthur A., to United States of America, National Aeronautics and Space Administration. Coupling device for moving vehicles. 4,173,324, Cl. 244-161.000.
Rule, Robert B.; Wells, Martin A.; and Dance, John D., to Lever Brothers Company. Cationic surfactant compositions. 4,173,539, Cl. 252-88.000.
Rumsey, Royce D.: *See*—
Pauly, Ronald R.; and Rumsey, Royce D., 4,173,095, Cl. 46-201.000.
Rusch, William C. Christmas ornament and kit for making the same. 4,173,667, Cl. 428-11.000.
Ruter, Jorn: *See*—
Bax, Hanns-Jorg; Ruter, Jorn; and Feinauer, Roland, 4,173,658, Cl. 427-27.000.
Rydell, Adam Z.: *See*—
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Ryffel, James R.: *See*—
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Saboe, Joseph C.: *See*—
Dempski, Robert E.; Mehta, Gunvant N.; and Saboe, Joseph C., 4,173,626, Cl. 424-19.000.
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, to Sekisui Kagaku Kogyo Kabushiki Kaisha; and Sekisui Kasehin Kogyo Kabushiki Kaisha. Process for preparing styrenic polymer foams. 4,173,688, Cl. 521-56.000.
Saito, Fumitaka: *See*—
Ashida, Takeshi; Saito, Fumitaka; and Akamatsu, Masateru, 4,173,669, Cl. 428-35.000.
Sakaki, Yoshihiro; and Eishima, Kensuke, to Nissan Motor Co., Ltd. Seal for a rotary regenerative heat exchanger. 4,173,252, Cl. 165-9.000.
Sakamoto, Eiichi: *See*—
Habu, Teiji; Nakajima, Tomio; Sakamoto, Eiichi; Fujimori, Noboru; and Mine, Kiyomitsu, 4,173,483, Cl. 430-575.000.
Sallmann, Alfred; and Pfister, Rudolf, to Ciba-Geigy Corporation. Phenylacetohydroxamic acids. 4,173,577, Cl. 260-500.50H.
Sandberg, Glenn A., to Formax, Inc. Frost removal apparatus for cryogenic freezing tunnel. 4,173,127, Cl. 62-374.000.
Sandell, Lionel S.: *See*—
Abrams, Lloyd; and Sandell, Lionel S., 4,173,491, Cl. 106-288.00B.
Sanders Associates, Inc.: *See*—
Lewandowski, Leon M., 4,173,748, Cl. 367-123.000.
Sanders, James M.: *See*—
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.;

Light, Bette M.; and Granda, Edward J., 4,173,543, Cl. 252-174.110.
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,711, Cl. 568-665.000.

Sandoz Ltd.: *See—*
Dreyfuss, Michael M.; and Tscherter, Hans, 4,173,629, Cl. 424-118.000.

Sanko, John R., to Paris Manufacturing Company, Inc. Heat conditioning apparatus for shirt or blouse-like garment. 4,173,300, Cl. 223-70.000.

Sanyo Chemical Industries, Ltd.: *See—*
Sato, Teruyuki; and Kawakatsu, Kunio, 4,173,542, Cl. 252-78.100.

Sanyo Machine Works, Ltd.: *See—*
Hashimoto, Hiroshi; and Mori, Kinya, 4,173,059, Cl. 29-240.000.

Sanzenbacher, Charles W.: *See—*
Meissner, David C.; and Sanzenbacher, Charles W., 4,173,465, Cl. 75-35.000.

Sargis, Sargis E. Light-weight structural system and modular concrete building components therefor. 4,173,103, Cl. 52-79.130.

Sato, Hideo: *See—*
Yamada, Kazuji; Sato, Hideo; Okayama, Tsutomu; Nishihara, Motohisa; Matsuoka, Yoshitaka; Katohgi, Katsuya; Matsuda, Yasumasa; and Shimada, Satoshi, 4,173,148, Cl. 73-766.000.

Sato Kogyo Kabushiki Kaisha: *See—*
Kubota, Seizo, 4,173,430, Cl. 417-53.000.

Sato, Teruyuki; and Kawakatsu, Kunio, to Sanyo Chemical Industries, Ltd. Hydraulic fluid comprising a borate ester and corrosion inhibiting amounts of an oxyalkylated alicyclic amine. 4,173,542, Cl. 252-78.100.

Satoh, Ken, to Olympus Optical Co., Ltd. Tape end alarm for tape recorder. 4,173,773, Cl. 360-67.000.

Satomi, Toyokazu: *See—*
Tabata, Yasuhiro; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Kaneko, Tamaki, 4,173,410, Cl. 355-24.000.

Sauli, Michel: *See—*
Metivier, Jean; and Sauli, Michel, 4,173,709, Cl. 562-471.000.

Saunders, Roger A., to Rockwell International Corporation. Filtering configuration using feed-through capacitor. 4,173,745, Cl. 333-182.000.

Savage, Robert C., to Xerox Corporation. Dispenser having reciprocating paddles for discharging particles therefrom. 4,173,294, Cl. 222-1.000.

Savvides, Loucas. Sprinklers. 4,173,308, Cl. 239-383.000.

Sawmiller, Craig S.: *See—*
Sawmiller, Nile E.; and Sawmiller, Craig S., 4,173,154, Cl. 74-217.00B.

Sawmiller, Nile E.; and Sawmiller, Craig S. Bicycle drive sprocket system. 4,173,154, Cl. 74-217.00B.

Saylor, William H.; and Narey, James O. Changeable printed alphanumeric display module. 4,173,087, Cl. 40-518.000.

Schad, Robert D.: *See—*
Rees, Herbert; and Schad, Robert D., 4,173,448, Cl. 425-549.000.

Schaefer, John W., to Nachman Corporation. Tubular border frame for inner spring assemblies. 4,173,047, Cl. 5-260.000.

Schaeffer, Robert L., to General Electric Company. Rotary cutter blade. 4,173,310, Cl. 241-282.100.

Schafer, Wilhelm. Apparatus for mounting and dismounting vehicle tires. 4,173,245, Cl. 157-1.240.

Schatteman, Etienne A. M., to Staar, S.A. Direct drive for fast forward and reverse in tape deck. 4,173,320, Cl. 242-206.000.

Schatz, Anton: *See—*
Massengeil, Hans A.; Stemme, Otto; Eppe, Rudolf; Pfeifer, Josef; Konigl, Georg; and Schatz, Anton, 4,173,411, Cl. 355-50.000.

Schatz, Klaus W.: *See—*
Heffley, Scott A.; and Schatz, Klaus W., 4,173,527, Cl. 208-153.000.

Scheinecker, Alois, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Mould arrangement to be used in a continuous casting plant. 4,173,251, Cl. 164-436.000.

Scheirer, Winfried: *See—*
Katinger, Hermann; and Scheirer, Winfried, 4,173,516, Cl. 435-286.000.

Schell, Friedrich. Apparatus for the automatic loading of a continuously working machine. 4,173,426, Cl. 414-737.000.

Scherer, Kirby V., to California Institute of Technology. Novel fluorohydrocarbons. 4,173,654, Cl. 424-350.000.

Schering Corporation: *See—*
Gold, Elijah H.; and Solomon, Daniel M., 4,173,566, Cl. 260-239.00A.
Gold, Elijah H.; and Chang, Wei, 4,173,583, Cl. 260-559.00S.

Scheule, Harold J.; and Starn, Roy E., Jr., to Du Pont de Nemours, E. I., and Company. Polyolefin/acylated poly(alkyleneamine) two component fuel additive. 4,173,456, Cl. 44-62.000.

Schilder, Nell. Bulky yarn spindle for spinning wheels. 4,173,116, Cl. 57-316.000.

Schimmelpfennig, Ella Anneliese, nee Lehmann, sole heir: *See—*
Tauber, Manfred; Heuer, Dieter; Kroncke, Max; and Schimmelpfennig, Peter, deceased, 4,173,719, Cl. 250-310.000.

Schimmelpfennig, Peter, deceased: *See—*
Tauber, Manfred; Heuer, Dieter; Kroncke, Max; and Schimmelpfennig, Peter, deceased, 4,173,719, Cl. 250-310.000.

Schmid, Dieter: *See—*
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Schmidbaur, Hubert; and Karsch, Hans-Heinz, to Hoechst Aktiengesellschaft. Process for making tetramethyldiphosphinomethane. 4,173,590, Cl. 260-606.50P.

Schmidt, Ferenc J.; and Betz, Jacob F., to Ametek, Inc. Amorphous lead dioxide photovoltaic generator. 4,173,497, Cl. 136-89.0SJ.

Schmidt, Henry A.; Gable, Larry P.; and Hammel, Wallace W., Jr., to Tuftco Corp. Electrohydraulic needle bar positioning apparatus for tufting machines. 4,173,192, Cl. 112-79.00R.

Schmit, David E.; and Richmond, Jon C., to Cincinnati Electronics Corporation. Jet aircraft and/or missile plume simulator. 4,173,777, Cl. 362-253.000.

Schmitt, Frederick L.: *See—*
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,543, Cl. 252-174.110.
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,711, Cl. 568-665.000.
Yoshida, Takao; Mookherjee, Braja D.; Kamath, Venkatesh; Hall, John B.; Taylor, William I.; and Schmitt, Frederick L., 4,173,585, Cl. 260-586.00R.

Schmitz, Reinold; and Wunderlich, Klaus, to Bayer Aktiengesellschaft. Process for the preparation of copper phthalocyanine. 4,173,568, Cl. 260-314.500.

Schoer, Heinz: *See—*
Schultze, Werner; and Schoer, Heinz, 4,173,302, Cl. 228-219.000.

Schon, Franz: *See—*
Birke, Walter; von der Eltz, Hans-Ulrich; and Schon, Franz, 4,173,077, Cl. 34-23.000.

Schrank, Jerome, to Allied Energy Corporation. Device for injecting air processed to increase its humidity into oil burning furnaces. 4,173,450, Cl. 431-190.000.

Schroeder, Stephen M.: *See—*
Grimes, Jerry W.; Schroeder, Stephen M.; and Waters, James M., 4,173,747, Cl. 336-60.000.

Schroth, Wilhelm H. Method and apparatus for producing multiple groove V-belt pulleys. 4,173,136, Cl. 72-58.000.

Schultz, Edwin R. Anti-skid vehicle tire chains. 4,173,244, Cl. 152-218.000.

Schultze, Werner; and Schoer, Heinz, to Vereinigte Aluminium-Werke Aktiengesellschaft. Process and alloy for brazing aluminum-containing articles. 4,173,302, Cl. 228-219.000.

Schulz, Johann G. D.; and Onopchenko, Anatoli, to Gulf Research and Development Company. Process for preparing 3,4,3,4-benzophenone-tetracarboxylic dianhydride. 4,173,573, Cl. 260-346.400.

Schure, Alexander; and Glenn, William E., to New York Institute of Technology. Three dimensional display. 4,173,391, Cl. 350-96.250.

Schutz, Heinz-Dieter: *See—*
Ranz, Erwin; Lohmann, Joachim W.; and Schutz, Heinz-Dieter, 4,173,479, Cl. 430-507.000.

Schutz, Udo. Pallet container. 4,173,288, Cl. 220-1.500.

Schwehr, Richard A.: *See—*
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Schweitzer Industrial Corporation: *See—*
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Science Spectrum, Inc.: *See—*
Wyatt, Philip J., 4,173,415, Cl. 356-336.000.

Scott & Fetzer Company, The: *See—*
Burgoon, Jack L.; and Knowlton, Christopher M., 4,173,052, Cl. 15-83.000.

Scriver, Robert E.: *See—*
Couleur, John F.; and Scriver, Robert E., 4,173,783, Cl. 364-200.000.

Seiler, Claus-Dieter; Vahlensieck, Hans-Joachim; and Kotzsch, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Process for the esterification of chlorosilanes. 4,173,576, Cl. 260-448.80R.

Sekine, Mitsuo, to Citizen Watch Co., Ltd. Driving circuit for electrochromic display devices. 4,173,758, Cl. 340-785.000.

Sekine, Noriyuki: *See—*
Tabana, Minoru; Sekine, Noriyuki; Mitsuno, Tatsuyuki; and Kinoshita, Akira, 4,173,561, Cl. 260-45.75B.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See—*
Nakano, Shiro; and Hotta, Masahiro, 4,173,677, Cl. 428-335.000.
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,173,688, Cl. 521-56.000.

Sekisui Kasehin Kogyo Kabushiki Kaisha: *See—*
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,173,688, Cl. 521-56.000.

Sera, Hidefumi; Ishii, Tsumoru; Yamaguchi, June; and Shiraishi, Hisashi, to Fuji Photo Film Co., Ltd. Method of hardening gelatin and photographic light-sensitive material. 4,173,481, Cl. 430-621.000.

Shaughnessy, Ernest P. Pneumatically braked blade assembly for a clipper machine. 4,173,162, Cl. 83-617.000.

Shell, John W., to Alza Corporation. Device for administering solid drug particles to an eye. 4,173,226, Cl. 128-233.000.

Shell Oil Company: *See—*
Koenders, Peter; Van der Zeeuw, Abraham J.; and Kok, Riekert, 4,173,616, Cl. 423-24.000.
Peterson, Larry W.; Bozarth, Gene A.; and Pilgram, Kurt H. G., 4,173,463, Cl. 71-87.000.

Shelton, Jack: *See—*
Leasure, William; Garcia, Luis; Reifel, Charles; and Shelton, Jack, 4,173,106, Cl. 53-449.000.

Shepard, Kenneth L.; and Paleveda, William J., Jr., to Merck & Co., Inc. Tricyclicdicarboximides. 4,173,646, Cl. 424-270.000.
Sheppard, Joseph S.: *See—*
Standing, John M.; and Sheppard, Joseph S., 4,173,376, Cl. 308-189.00A.
Shiah, Chyn-Duog, to CDC Research Inc. Topical hair coloring formulation in the form of suspension, lotion and cream. 4,173,453, Cl. 8-10.100.
Shiba, Keisuke; Kubotera, Kikuo; and Kashiwabara, Akira, to Fuji Photo Film Co., Ltd. Photographic material with developer in AzX emulsion and sublayer. 4,173,477, Cl. 430-264.000.
Shibata, Isamu: *See—*
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Shibata, Toshihiro: *See—*
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Shida, Mitsuzo: *See—*
Pullukat, Thomas J.; Shida, Mitsuzo; and Hoff, Raymond E., 4,173,548, Cl. 252-430.000.
Shimada, Satoshi: *See—*
Yamada, Kazuji; Sato, Hideo; Okayama, Tsutomu; Nishihara, Motohisa; Matsuoka, Yoshitaka; Katohgi, Katsuya; Matsuda, Yasumasa; and Shimada, Satoshi, 4,173,148, Cl. 73-766.000.
Shimano Industrial Company, Limited: *See—*
Hamayasu, Norio; and Kamikawa, Kiyohide, 4,173,317, Cl. 242-84.21R.
Noda, Hideo, 4,173,316, Cl. 242-84.20R.
Shimizu, Kazushige; and Maeda, Takuma, to Ube Industries, Ltd. Process for forming a billet for extrusion. 4,173,061, Cl. 29-403.200.
Shimizu, Masami, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Extraction method of tritium. 4,173,620, Cl. 423-249.000.
Shimizu, Toshihide: *See—*
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Katusima, Sensaku; and Kaneko, Ichiro, 4,173,696, Cl. 526-62.000.
Shin-Etsu Chemical Co., Ltd.: *See—*
Koyanagi, Shunichi; Hasegawa, Niichiro; Shimizu, Toshihide; Katusima, Sensaku; and Kaneko, Ichiro, 4,173,696, Cl. 526-62.000.
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Shipman, James J.; Hallman, Robert W.; Tenney, Linwood P.; and Beall, Leman G., Jr., to B. F. Goodrich Company, The. Method of making a radial tire. 4,173,503, Cl. 156-123.00R.
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Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,711, Cl. 568-665.000.
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Sieghartner, Leonard J., to Roy E. Roth Company. Floating seals. 4,173,350, Cl. 277-40.000.
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Turini, Gerhard; and Matthies, Alfred, 4,173,301, Cl. 226-102.000.
von Musil, Rudolf, 4,173,724, Cl. 310-258.000.
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Holstead, Colin; Kilminster, Kenneth N.; and Simons, Michael J., 4,173,478, Cl. 430-353.000.
Simpson, John G., to United States of America, National Aeronautics and Space Administration. Solar concentrator. 4,173,397, Cl. 350-295.000.
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Heath, William H.; and Richman, Jack, 4,173,784, Cl. 364-453.000.
Millard, Maurice; Peters, David L.; Trzeciak, John R.; and Woycechowsky, Brian J., 4,173,081, Cl. 35-12.00N.
Sitzmann, Michael E.: *See—*
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Skerlos, Peter C.; and Smirl, Richard A., to Zenith Radio Corporation. Limited position, non-volatile memory tuning system. 4,173,737, Cl. 325-418.000.
Skinner, Robert T. J., to Lucas Industries Limited. Pressure regulator for a fluid pump. 4,173,434, Cl. 417-294.000.
Skrentner, Frank C., to F. Jos. Lamb Company. Transfer mechanism and method. 4,173,159, Cl. 82-1.00C.
Slothour, Donald L.: *See—*
Kauffman, Roger S.; and Slothour, Donald L., 4,173,386, Cl. 339-177.00R.
Small, Edward A., Jr.: *See—*
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Smirl, Richard A.: *See—*
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Smith, Clay D.; and Keller, Douglas V., Jr., to Otisca Industries, Ltd. Methods of and apparatus for cleaning coal. 4,173,530, Cl. 209-9.000.
Smith, Curtis P.; and Ulrich, Henri, to Upjohn Company, The. Process for preparing spirocyclic phosphorus compounds. 4,173,602, Cl. 260-971.000.
Smith, Elmer L. Planter. 4,173,098, Cl. 47-80.000.
Smith, George H.; and Olofson, Peter M., to Minnesota Mining and Manufacturing Company. Complex salt photoinitiator. 4,173,476, Cl. 430-280.000.
Smith, James D. B.; and Kauffman, Robert N., to Westinghouse Electric Corp. Metal acetylacetonate latent accelerators for an epoxy-styrene resin system. 4,173,593, Cl. 525-109.000.
Smith Kline & French Laboratories Limited: *See—*
Brown, Thomas H.; Durant, Graham J.; Ganellin, Charon R.; and Ife, Robert J., 4,173,644, Cl. 424-270.000.
Smith, Roland L., to Nu-Watt, Inc. Road vehicle-actuated air compressor and system therefor. 4,173,431, Cl. 417-229.000.
Smith, Thomas J., to Alloys, Incorporated. Hardfacing composition of nickel-bonded sintered chromium carbide particles and tools hardfaced thereof. 4,173,457, Cl. 51-309.000.
Snavely, Carol J.; Lewin, Ian; and Small, Edward A., Jr., to Optical Coating Laboratory, Inc. Lighting fixtures and glass enclosure having high angle anti-reflection coating. 4,173,778, Cl. 362-297.000.
Snellman, Donald L.; and Hudson, Willard G., to Norfin, Inc. Thermally stable helically plied cable. 4,173,113, Cl. 57-249.000.
Snyder, David E., to U.S. Industries, Inc. Pilot valve. 4,173,233, Cl. 137-102.000.
Snyder, James J., to United States of America, Commerce. Apparatus and method for determination of wavelength. 4,173,442, Cl. 356-346.000.
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Durrieu, Jean-Pierre; and Pomes, Guy, 4,173,681, Cl. 428-409.000.
Societe Anonyme dite: Omnium Francais Industriel et Commercial (O.F.I.C.): *See—*
Vallon, Roger; Herdenberger, Andre; and Delhomelle, Marc, 4,173,675, Cl. 428-291.000.
Societe de Fabrication d'Instruments de Mesure (S.F.I.M.): *See—*
Vauchy, Jean-Marie; and de Ponteves, Dominique, 4,173,414, Cl. 356-152.000.
Societe Metallurgique le Nickel-S.L.N.: *See—*
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Societe Nationale Elf Aquitaine (Production): *See—*
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Solomon, Daniel M.: *See—*
Gold, Elijah H.; and Solomon, Daniel M., 4,173,566, Cl. 260-239.00A.
Solvay & Cie: *See—*
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Sony Corporation: *See—*
Chatani, Ikuo, 4,173,267, Cl. 181-199.000.
Yoshida, Tadao, 4,173,739, Cl. 330-298.000.
Sornberger, G. Russell, to Moore Business Forms, Inc. Interlocked continuous webs. 4,173,359, Cl. 282-11.50A.
Soulier, Joel, to Isobox-Barbier. Process and apparatus for the manufacture of expanded plastics materials. 4,173,608, Cl. 264-26.000.
Span Instruments, Inc.: *See—*
Gray, Tommy L., 4,173,150, Cl. 73-714.000.
Sperry Rand Corporation: *See—*
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Staar, S.A.: *See—*
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Staby, George L. Container with raised indentations for aeration and drainage. 4,173,097, Cl. 47-66.000.
Staendeke, Horst, to Hoechst Aktiengesellschaft. Production of alkenyl phosphinic acids. 4,173,578, Cl. 260-502.40R.
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Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning machine with a plurality of spinning assemblies and at least one mobile servicing device. 4,173,114, Cl. 57-263.000.

Stahlecker, Hans: *See*—
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Stamicarbon, B.V.: *See*—
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Standard Oil Company (Indiana): *See*—
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Stanko, John J. Reusable resilient packaging. 4,173,286, Cl. 206-433.000.
Stanley, Donald E., to CBS, Inc. Organ stop switching system. 4,173,167, Cl. 84-345.000.
Stansbury, Benjamin: *See*—
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Stansbury, Benjamin H., Jr.; and Fluster, Barry, to AVSP, Inc. Spare lamp holder. 4,173,282, Cl. 206-216.000.
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Stearns, Stanley D. Adaptor assembly for fittings and connective lines of differing sizes. 4,173,363, Cl. 285-177.000.
Steele, Richard W. Towing hitch alignment director. 4,173,353, Cl. 280-477.000.
Steinacker, Karl-Heinz; and Adolphen, Gerhard, to Bayer Aktiengesellschaft. Process for the preparation of alkylthiosemicarbazides. 4,173,581, Cl. 260-552.0SC.
Steiner, Charles D.; and Sucheski, Matthew M., to AMP Incorporated. Applicator apparatus for use with rotary connector. 4,173,067, Cl. 29-749.000.
Steingiser, Samuel: *See*—
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Stevenson, Alastair K., to Hughes Aircraft Company. CMOS monolithic integrated circuit. 4,173,767, Cl. 357-44.000.
Steverding, Bernard, to United States of America, Army. Multipurpose protection system. 4,173,187, Cl. 102-105.000.
Stewart, Donald E., to Xerox Corporation. Demand publishing royalty accounting system for an electrostatic copier. 4,173,408, Cl. 355-14.00R.
Stewart, John V., to Swiss Aluminium Ltd. Engraver's template. 4,173,075, Cl. 33-23.00K.
Stewart, Robert C., Jr., to United Technologies Corporation. Process for forming a fuel cell matrix. 4,173,662, Cl. 427-115.000.
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Stieger, Frank M., to Polaroid Corporation. Methods for manufacturing photographic film processing rollers. 4,173,058, Cl. 29-148.40D.
Stiles, Arthur G. Air cleaner. 4,173,458, Cl. 55-405.000.
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Stingl, Hans A., to Toms River Chemical Corporation. Rubine disazo acid dyes for polyamides. 4,173,565, Cl. 260-191.000.
Stith, Morris R., Jr. Jack for positioning and supporting a machine. 4,173,329, Cl. 254-93.00R.
Stock, Herman E. Golf club wood holder. 4,173,241, Cl. 150-1.50R.
Stokes, James R.: *See*—
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Stolfo, John J., to Mead Corporation, The. Production of novel metal modified novolak resins and their use in pressure sensitive papers. 4,173,684, Cl. 428-531.000.
Stone, Robert P.; and Morrell, Albert M., to RCA Corporation. Cathode-ray tube having a stepped shadow mask. 4,173,729, Cl. 313-403.000.
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Stoy, Vladimir; Stoy, Artur; Zima, Jiri; and Kalal, Jaroslav, to Ceskoslovenska akademie ved. Method of manufacturing shaped articles from crystalline acrylonitrile polymers and copolymers. 4,173,606, Cl. 264-1.000.
Stratton, Raymond G.: *See*—
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Strecker, Lawrence A.; and Wells, Vernon W., Jr., to Inmont Corporation. Insulating sealant compositions. 4,173,557, Cl. 260-31.8DR.
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Stubblefield, Thomas W.; and Benke, Frank W., to Electric Power Research Institute, Inc. Vaporization cooled electrical apparatus. 4,173,746, Cl. 336-57.000.
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Sugalski, Raymond K.; and Blake, Charles R., to General Electric Company. Battery charger with liquid crystal charge current indicator. 4,173,733, Cl. 320-48.000.
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Sugimoto, Isao, to Yoshida Kogyo Kabushiki Kaisha; and Nippon Dyeing Machine Mfg. Co., Ltd. Dyeing apparatus. 4,173,132, Cl. 68-189.000.
Suhr, Robert G., to Eli Lilly and Company. 1-Benzoyl-3-(alkoxy- or alkylthiopyridinyl)ureas. 4,173,639, Cl. 424-263.000.
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Sumitomo Aluminum Smelting Company, Limited: *See*—
Yamada, Koichi; Hashimoto, Tadanori; and Horinouchi, Kazuo, 4,173,518, Cl. 204-67.000.
Sumitomo Chemical Company, Limited: *See*—
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Tabana, Minoru; Sekine, Noriyuki; Mitsuno, Tatsuyuki; and Kinoshita, Akira, 4,173,561, Cl. 260-45.75B.
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Arthur, Richard P., 4,173,179, Cl. 99-374.000.
Sundeen, Joseph E.; Dejneka, Tamara; and Hauck, Frederic P., to E. R. Squibb & Sons, Inc. 5-Phenyl-2,4-pentadien-1-amines and method for inhibiting prostaglandin dehydrogenase. 4,173,649, Cl. 424-304.000.
Sundt, Erling; and Aschiero, Roland, to Firmenich SA. Perfumed articles containing 3-phenyl-cyclopent-2-en-1-one. 4,173,550, Cl. 252-522.000.
Sutherland, David T.: *See*—
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Sutherland, John D.: *See*—
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Sutliff, Wayne N.; and Downen, Jim L. Drilling shock sub. 4,173,130, Cl. 64-23.000.
Suzuki, Mikio: *See*—
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Suzuki, Shuichi; Wada, Moriyasu; Kajiura, Sedao; and Ito, Takeo, to Tokyo Shibaura Electric Co., Ltd. Heat-resistant resin composition. 4,173,592, Cl. 525-134.000.
Suzuki, Takaya: *See*—
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Svensson, Eric. Device for transfer of air in one or the other direction between two places. 4,173,176, Cl. 98-115.0VM.
Swapceinski, John P.; Hilbert, Thomas K.; and McGlen, James A., to Eastman Kodak Company. Developer distribution apparatus. 4,173,405, Cl. 355-3.0DD.
Swiss Aluminium Ltd.: *See*—
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Sybron Corporation: *See*—
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ing 1,1-di-(2-methoxycarbonyl-ethyl)-1,2,3,4,5,6,12,12b-octahydro-indolo[2,3-a]quinolizine. 4,173,642, Cl. 424-267.000.
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Tabana, Minoru; Sekine, Noriyuki; Mitsuno, Tatsuyuki; and Kinoshita, Akira, to Sumitomo Chemical Company, Limited. Flame retardant polymer composition. 4,173,561, Cl. 260-45.75B.
Tabata, Yasuhiro; Satomi, Toyokazu; Koizumi, Yutaka; Nakamura, Isao; and Kaneko, Tamaki, to Ricoh Company, Ltd. Method of duplex copying. 4,173,410, Cl. 355-24.000.
Tadanier, John S.; Martin, Jerry R.; and Kurath, Paul, to Abbott Laboratories. 4-N-acylfortimicin B derivatives and the chemical conversion of fortimicin B to fortimicin A. 4,173,564, Cl. 260-112.50R.
Taddicken, Hermann, to Eisele Apparate- und Geratebau GmbH. Sewing unit with sectionwise shiftable clamping device. 4,173,191, Cl. 112-65.000.
Tafel, Leonard I.: *See—*
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Takagi, Shunichi; and Fukuoka, Masaru, to NGK Spark Plug Co., Ltd. Resistor composition for spark plug having a resistor enclosed therein. 4,173,731, Cl. 315-58.000.
Takahashi, Hirokazu, to Tokyo Shibaura Electric Co., Ltd. Microwave heating apparatus. 4,173,716, Cl. 219-10.55F.
Takahashi, Kazutoshi; Nitta, Tatsuo; and Iwakura, Ryoji, to Citizen Watch Co., Ltd. Electronic timepiece. 4,173,117, Cl. 58-85.500.
Takahashi, Tadashi: *See—*
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Takahashi, Toshiyuki: *See—*
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Takamatsu, Ikuo, to Yoshida Kogyo Kabushiki Kaisha. Support strip for ready-for use arrangement of sliders in the manufacture of slide fasteners. 4,173,283, Cl. 206-338.000.
Takayama, Satoshi: *See—*
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Takayama, Teruo; Yamada, Kinsaku; and Niida, Chiaki, to Hitachi, Ltd. Control valve of exhaust recirculation apparatus. 4,173,204, Cl. 123-119.00A.
Takeda, Naoshi: *See—*
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Tamura, Keiichi; Iwatsuki, Masahiro; and Matsunami, Muncharu, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Webbing retractor in safety seatbelt system. 4,173,318, Cl. 242-107.40A.
Tanaka, Hideo: *See—*
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Tanaka, Takashi; and Nishide, Katsuhiko, to Canon Kabushiki Kaisha. Hologram and method of production using two solvent treatments. 4,173,474, Cl. 430-1.000.
Tanaka, Toru: *See—*
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Tanner, Randall C.: *See—*
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Tauber, Manfred; Heuer, Dieter; Kroncke, Max; and Schimmelpfennig, Peter, deceased (by Schimmelpfennig, Ella Anneliese, nee Lehmann, sole heir), to Licentia Patent-Verwaltungs-G.m.b.H. Apparatus for irradiating flowing materials. 4,173,719, Cl. 250-310.000.
Taylor, Kenneth C.: *See—*
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Teleflex Incorporated: *See—*
Miller, Donald M.; and Webb, Grant A., 4,173,157, Cl. 74-501.00R.
Telsco Industries, Inc.: *See—*
Ridgway, H. Curtis, 4,173,306, Cl. 239-230.000.
Temes, Gabor C.; and Cheung, Derek T., to Rockwell International Corporation. Photo detector input circuit. 4,173,723, Cl. 307-304.000.
Tennant Company: *See—*
Geyer, Robert A., 4,173,056, Cl. 15-320.000.
Tenney, Linwood P.: *See—*
Shipman, James J.; Hallman, Robert W.; Tenney, Linwood P.; and Beall, Leman G., Jr., 4,173,503, Cl. 156-123.00R.
Texaco Inc.: *See—*
Crawford, Wheeler C.; and wilson, James R., 4,173,489, Cl. 106-281.00N.
McCall, Richard H., 4,173,536, Cl. 210-242.00S.
Paull, Peter L.; and McGann, Rodney, 4,173,254, Cl. 165-134.00R.
Texas Instruments Incorporated: *See—*
Chiang, Shang-Yi; and Carbajal, Bernard G., 4,173,496, Cl. 136-89.0MS.
Farnow, Stephen A., 4,173,064, Cl. 29-578.000.
Textilipari Kutato Intezet: *See—*
Katona, Tibor; Kenderesy, Tamas; Nemes, Imre; Erdelyi, Agoston; and Ragalyi, Jozsef, 4,173,787, Cl. 364-550.000.
Textron Inc.: *See—*
Bahr, Karl E., 4,173,607, Cl. 264-25.000.
Tezuka, Tohru: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,173,630, Cl. 424-177.000.
Thiokol Corporation: *See—*
Wade, Robert C., 4,173,521, Cl. 204-157.10R.
Thomas, David F.; and Platt, Earl A., to Waterous Company. Transfer valve. 4,173,234, Cl. 137-625.470.
Thomas International Corporation: *See—*
Koepke, Donald B., 4,173,166, Cl. 84-343.000.
Thompson, Daniel G.: *See—*
Hoffman, Joseph H.; and Thompson, Daniel G., 4,173,429, Cl. 416-184.000.
Thompson, Vernal W.; and Anderson, Wilbert C., to Sperry Rand Corporation. Reference signal generating apparatus. 4,173,762, Cl. 343-759.000.
Thomson-CSF: *See—*
Beguin, Alain; Dubois, Jean-Claude; and Zann, Annie, 4,173,545, Cl. 252-299.000.
de Cremoux, Baudouin, 4,173,764, Cl. 357-22.000.
Faillon, Georges; and Egloff, Guy, 4,173,744, Cl. 333-33.000.
Hareng, Michel; Hehlen, Robert; and Le Berre, Serge, 4,173,757, Cl. 340-765.000.
Thorby, Douglas C.; and Johnson, John, to Hawker Siddeley Aviation Limited. Aircraft launching techniques. 4,173,323, Cl. 244-114.00R.
Thornberg, John H., to Bethany Fellowship, Inc. Printer's paper pile inverter. 4,173,428, Cl. 414-766.000.
Tiberg, Lars: *See—*
Kollberg, Sten; and Tiberg, Lars, 4,173,299, Cl. 222-594.000.
TIE/Communications, Inc.: *See—*
Bloch, Alan; Coviello, Frank A.; Guzik, Ira; and Puebla, Candido, 4,173,714, Cl. 179-99.00R.
Tigner, Calvin L.: *See—*
Olsen, Wayne A.; and Tigner, Calvin L., 4,173,200, Cl. 119-23.000.
Tipper, Maynard J. G. Method and apparatus for forming wire to noncircular cross sections. 4,173,235, Cl. 140-82.000.
Tobey, Frederic S., to W. H. Brady Co. Separating laminated layers. 4,173,507, Cl. 156-443.000.
Tobey, Frederic S., to W. H. Brady Co. Apparatus for separating laminated layers. 4,173,510, Cl. 156-584.000.
Toelle, Alvin D., to Bendix Corporation, The. Closed loop exhaust gas recirculation system. 4,173,205, Cl. 123-119.00A.
Togami, Paul G.; Drayer, T. Gary; and Francis, James M., to International Harvester Company. Variable diameter torque sensing drive. 4,173,155, Cl. 74-230.17M.
Toki, Tadaaki: *See—*
Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; Yamamoto, Toshihiko, deceased; and Yamamoto, Hikotaro, legal representative, 4,173,637, Cl. 424-263.000.
Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; and Yamamoto, Toshihiko, 4,173,638, Cl. 424-263.000.
Tokiwa Chemical Industries Limited: *See—*
Nakai, Tadanobu, 4,173,092, Cl. 43-61.000.
Nakai, Tadanobu, 4,173,093, Cl. 43-121.000.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Hirasawa, Masataka; Hashimoto, Akira; Nagao, Kenichi; and Kobayashi, Toshiaki, 4,173,734, Cl. 323-8.000.
Kawagai, Kenji; Yoshida, Shigeki; Ogawa, Hisaharu; and Ohashi, Toshiro, 4,173,756, Cl. 340-636.000.
Miura, Haruhisa, 4,173,789, Cl. 364-760.000.
Suzuki, Shuichi; Wada, Moriyasu; Kajiura, Sadao; and Ito, Takeo, 4,173,592, Cl. 525-134.000.
Takahashi, Hirokazu, 4,173,716, Cl. 219-10.55F.
Tokyo Shibaura Kenki Kabushiki Kaisha: *See—*
Fujii, Katsumasa; and Takeda, Naoshi, 4,173,124, Cl. 60-667.000.
Tomioka, Susumu; and Kunimune, Kohichi, to Chisso Corporation. Method for producing tobacco filters. 4,173,504, Cl. 156-180.000.
Tomlinson, Walter J., III: *See—*
Chandross, Edwin A.; and Tomlinson, Walter J., III, 4,173,475, Cl. 430-290.000.
Toms River Chemical Corporation: *See—*
Stingl, Hans A., 4,173,565, Cl. 260-191.000.
Tomy Corporation: *See—*
Kanno, Hideyuki, 4,173,340, Cl. 273-95.00A.
Tonka Corporation: *See—*
Pauly, Ronald R.; and Rumsey, Royce D., 4,173,095, Cl. 46-201.000.

Tonomura, Shinji: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,173,630, Cl. 424-177.000.

Toolmatic Corporation of Connecticut: *See—*
MacBroom, James, Jr., 4,173,100, Cl. 51-227.00H.

Toporcer, Louis H.: *See—*
Homan, Gary R.; Maxson, Myron T.; and Toporcer, Louis H., 4,173,560, Cl. 260-37.0SB.

Torii, Sigeru; Tanaka, Hideo; and Kobayashi, Yuichi, to Otsuka Kagaku Yakuhin Kabushiki Kaisha. Cyclopentanol derivatives. 4,173,707, Cl. 560-122.000.

Towmotor Corporation: *See—*
Erker, James W.; and Schwehr, Richard A., 4,173,264, Cl. 180-68.500.

Toyo Kagaku Kabushiki Kaisha: *See—*
Asakura, Hiroshi; Chimura, Ippei; Kitazume, Keisuke; Kaneko, Yoshiyuki; Fuse, Shirou; and Ueno, Akio, 4,173,676, Cl. 428-332.000.

Toyo Seikan Kaisha, Ltd.: *See—*
Kobayashi, Seishichi; Mori, Tatsuo; and Ueno, Hiroshi, 4,173,290, Cl. 220-75.000.

Toyoda-Koki Kabushiki-Kaisha: *See—*
Kondo, Yukio; Kawabata, Minoru; and Suzuki, Mikio, 4,173,152, Cl. 74-190.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Kondo, Yukio; Kawabata, Minoru; and Suzuki, Mikio, 4,173,152, Cl. 74-190.000.

Transdynamics: *See—*
Pounder, Edwin, 4,173,144, Cl. 73-229.000.

Treadwell, Kenneth, to M&T Chemicals Inc. Catalyst composition for flexible polyurethane foams. 4,173,691, Cl. 521-124.000.

Trought, John H., to Intermedics Intraocular, Inc. Intraocular lens packaging system. 4,173,281, Cl. 206-5.100.

Trouillet, Paul: *See—*
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,173,710, Cl. 568-614.000.

TRW Inc.: *See—*
Green, Howard E.; Jones, Robert J.; and O'Rell, Michael K., 4,173,700, Cl. 528-125.000.

Tryon, Max: *See—*
Pizer, Robert S.; and Tryon, Max, 4,173,266, Cl. 181-156.000.

Trzeciak, John R.: *See—*
Millard, Maurice; Peters, David L.; Trzeciak, John R.; and Woycechowsky, Brian J., 4,173,081, Cl. 35-12.00N.

Tscherter, Hans: *See—*
Dreyfuss, Michael M.; and Tscherter, Hans, 4,173,629, Cl. 424-118.000.

Tsuda, Naotsune, to Olympus Optical Co., Ltd. Method of manufacturing a magnetic head. 4,173,065, Cl. 29-603.000.

Tsuji, Morio: *See—*
Otsuka, Eiji; Inoue, Shigeru; Kimura, Tetsuo; Takae, Toshinori; Tsuji, Morio; and Kato, Toshiki, 4,173,615, Cl. 422-197.000.

Tuell, James L.: *See—*
Eglinton, Robert B.; and Tuell, James L., 4,173,108, Cl. 53-587.000.

Tufco Corp.: *See—*
Schmidt, Henry A.; Gable, Larry P.; and Hammel, Wallace W., Jr., 4,173,192, Cl. 112-79.00R.

Turini, Gerhard; and Matthies, Alfred, to Siemens Aktiengesellschaft. Pneumatic brake. 4,173,301, Cl. 226-102.000.

Turk, Chester F.: *See—*
Krapcho, John; and Turk, Chester F., 4,173,634, Cl. 424-248.400.

Ube Industries, Ltd.: *See—*
Shimizu, Kazushige; and Maeda, Takuma, 4,173,061, Cl. 29-403.200.

Ueda, Hiroshi; Oyokota, Shigeru; and Kajita, Hideo, to Minolta Camera Kabushiki Kaisha. Single lens reflex camera with automatic diaphragm control mechanism. 4,173,403, Cl. 354-152.000.

Ueno, Akio: *See—*
Asakura, Hiroshi; Chimura, Ippei; Kitazume, Keisuke; Kaneko, Yoshiyuki; Fuse, Shirou; and Ueno, Akio, 4,173,676, Cl. 428-332.000.

Ueno, Hiroshi: *See—*
Kobayashi, Seishichi; Mori, Tatsuo; and Ueno, Hiroshi, 4,173,290, Cl. 220-75.000.

Ueno, Tsutomu: *See—*
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,460, Cl. 65-40.000.
Ebata, Yoshihiro; Ueno, Tsutomu; Kataoka, Nagamasa; and Akao, Akimasa, 4,173,461, Cl. 65-106.000.

Uerdingen, Walter: *See—*
Findeisen, Kurt; Wagner, Kuno; and Uerdingen, Walter, 4,173,567, Cl. 548-216.000.

Ulrich, Henri: *See—*
Smith, Curtis P.; and Ulrich, Henri, 4,173,602, Cl. 260-971.000.

Ulrich, Lawrence W.; and Walker, Connie W., to Durable Packaging Corporation. Apparatus for sealing containers. 4,173,105, Cl. 53-374.000.

Umani-Ronchi, Achille: *See—*
Pifferi, Giorgio; Umani-Ronchi, Achille; Farina, Carlo; and Gamba, Afro, 4,173,648, Cl. 424-294.000.

Umeda, Hiroyuki, to Victor Company of Japan, Limited. Magnetic tape cassette. 4,173,319, Cl. 242-199.000.

Underwood, Ronald G.; and Hauser, James C. Flotation liner waterbed structure. 4,173,049, Cl. 5-451.000.

Union Carbide Corporation: *See—*
Cieloszyk, Gary S., 4,173,664, Cl. 427-385.00R.
Matsch, Ladislas C.; and Drnevich, Raymond F., 4,173,531, Cl. 210-5.000.
Weatherly, Merle H., 4,173,685, Cl. 428-556.000.

U.S. Industries, Inc.: *See—*
Snyder, David E., 4,173,233, Cl. 137-102.000.

United States of America
Air Force: *See—*
Macdonald, Kenneth A. B., 4,173,322, Cl. 244-75.00A.
Wilkinson, David B., 4,173,122, Cl. 60-247.000.
Army: *See—*
Dunham, James V., 4,173,186, Cl. 102-38.00R.
Fodor, George E.; Weatherford, William D., Jr.; and Wright, Bernard R., 4,173,455, Cl. 44-51.000.
Steverding, Bernard, 4,173,187, Cl. 102-105.000.
Commerce: *See—*
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Lasky, Jerome B.; and Moran, Paul R., 4,173,660, Cl. 427-38.000.
Williams, William R., 4,173,327, Cl. 251-31.000.
Interior: *See—*
Kissell, Fred N.; Maksimovic, Slavoljub D.; and Matta, Joseph E., 4,173,141, Cl. 73-40.700.
Liebman, Israel; Duda, Frank T.; and Conti, Ronald S., 4,173,140, Cl. 73-35.000.
National Aeronautics and Space Administration: *See—*
Rudmann, Arthur A., 4,173,324, Cl. 244-161.000.
Simpson, John G., 4,173,397, Cl. 350-295.000.
Navy: *See—*
Garrison, John B., 4,173,760, Cl. 343-112.00R.
Koppes, William M.; Adolph, Horst G.; and Sitzmann, Michael E., 4,173,591, Cl. 260-646.000.
Licata, William H., 4,173,785, Cl. 364-453.000.
Phillips, Raymond J., 4,173,384, Cl. 339-101.000.

U.S. Philips Corporation: *See—*
van Straaten, Jan, 4,173,769, Cl. 358-20.000.

United Technologies Corporation: *See—*
Cruff, Carlton E.; and Harrison, William E., 4,173,079, Cl. 34-217.000.
Stewart, Robert C., Jr., 4,173,662, Cl. 427-115.000.

University of Utah: *See—*
Lyman, Donald J.; and Fazzio, Frank J., 4,173,689, Cl. 521-64.000.

Unsworth, William; King, John F.; and Bradshaw, Stephen L., to Magnesium Elektron Limited. Magnesium alloys. 4,173,469, Cl. 75-168.00F.

UOP Inc.: *See—*
Richardson, J. Mark; and Novinski, Norbert L., II, 4,173,623, Cl. 423-494.000.

Upjohn Company, The: *See—*
Smith, Curtis P.; and Ulrich, Henri, 4,173,602, Cl. 260-971.000.

Upton, John: *See—*
Glover, John B.; and Upton, John, 4,173,362, Cl. 285-110.000.

Vachon, Raymond N.; and McConnell, Richard L., to Eastman Kodak Company. Hot melt sizing compositions and fibrous articles sized therewith. 4,173,680, Cl. 428-375.000.

Vahlensieck, Hans-Joachim: *See—*
Seiler, Claus-Dieter; Vahlensieck, Hans-Joachim; and Kotzsch, Hans-Joachim, 4,173,576, Cl. 260-448.80R.

Vallon, Roger; Herdenberger, Andre; and Delhomelle, Marc, to Societe Anonyme dite: Omnium Francais Industriel et Commercial (O.F.I.C.). Method for coloring or dying fibrous sheets impregnated with bituminous material. 4,173,675, Cl. 428-291.000.

Van Allan, James A.: *See—*
Petropoulos, Constantine C.; Reynolds, George A.; and Van Allan, James A., 4,173,473, Cl. 430-72.000.

VanAuken, Richard L., to Exxon Research & Engineering Co. Composite tubular elements. 4,173,670, Cl. 428-36.000.

van der Geest, Johannes M. P.: *See—*
Noomen, Arie; van der Geest, Johannes M. P.; de Jong, Cornelis; and Van Santen, Dick, 4,173,682, Cl. 428-423.000.

van der Heiden, George L.; and Larsson, Karl H., to van der Heiden, George Laurens. Drawer, particularly for a card index. 4,173,379, Cl. 312-330.0SM.

van der Heiden, George Laurens: *See—*
van der Heiden, George L.; and Larsson, Karl H., 4,173,379, Cl. 312-330.0SM.

van der Hoorn, Rudolf J. G. A.: *See—*
Horowitz, Alexandre; van der Hoorn, Rudolf J. G. A.; and Kummeling, Jozef W. M., 4,173,156, Cl. 74-230.17F.

van der Lely, Ary; and Bom, Cornelis J. G., to Cornelis van der Lely N.V. Soil cultivating implements. 4,173,260, Cl. 172-59.000.

van der Lely, Cornelis. Combination articulated tractor and tow car. 4,173,352, Cl. 280-415.00A.

Van der Zeeuw, Abraham J.: *See—*
Koenders, Peter; Van der Zeeuw, Abraham J.; and Kok, Riekert, 4,173,616, Cl. 423-24.000.

Vannest, Richard D.: *See—*
Aldridge, Clifton; Gibson, Sandra F.; Vannest, Richard D.; and Rodgers, Gregory D., 4,173,515, Cl. 435-38.000.

Van Santen, Dick: *See—*
Noomen, Arie; van der Geest, Johannes M. P.; de Jong, Cornelis; and Van Santen, Dick, 4,173,682, Cl. 428-423.000.

Van Steenwyk, Donald H.; and Childress, Ira N., to Applied Medical Devices. Catheter locating device. 4,173,228, Cl. 128-653.000.

van Straaten, Jan, to U.S. Philips Corporation. Circuit arrangement a portion of which is included within in a monolithic integrated semiconductor body. 4,173,769, Cl. 358-20.000.

Van Wingerden, Aart. Greenhouse gutter assembly. 4,173,101, Cl. 52-13.000.

Varaney, John A. Pillow configuration. 4,173,048, Cl. 5-436.000.

Varian Associates, Inc.: *See*—
Kneip, George D., Jr., 4,173,775, Cl. 361-141.000.

Vassiliades, Anthony E.; Shroff, Shrenik; and Nauman, Edward F., to Champion International Corporation. Oil-in-water emulsions containing hydropholeic starch. 4,173,488, Cl. 106-213.000.

Vauchy, Jean-Marie; and de Ponteves, Dominique, to Societe de Fabrication d'Instruments de Mesure (S.F.I.M.). Method and apparatus for correcting the aiming of an optical illuminator on a target. 4,173,414, Cl. 356-152.000.

Veloric, Harold S.: *See*—
Denlinger, Edgar J.; and Veloric, Harold S., 4,173,768, Cl. 357-68.000.

Venton-Walters, Roy, to Ricardo & Co., Engineers (1927) Limited. Fluid flow measuring apparatus. 4,173,143, Cl. 73-194.0VS.

Vepa AG: *See*—
Fleissner, Hans, 4,173,452, Cl. 8-1.0XB.

Vereinigte Aluminium-Werke Aktiengesellschaft: *See*—
Schultze, Werner; and Schoer, Heinz, 4,173,302, Cl. 228-219.000.

Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See*—
Scheinecker, Alois, 4,173,251, Cl. 164-436.000.

Vernon, William C., to Imperial Wax and Chemical Company. Wind resistant floatable pool cover and manufacture thereof. 4,173,043, Cl. 4-172.120.

Victor Company of Japan, Limited: *See*—
Umeda, Hiroyuki, 4,173,319, Cl. 242-199.000.
Watanabe, Yasuaki; and Okabe, Yukio, 4,173,770, Cl. 358-28.000.

Vignon, Louis, to Heberlein Hispano SA. Apparatus for receiving and gathering a fibre band from a card or stretcher. 4,173,057, Cl. 19-159.00R.

Vine, James, to Westinghouse Electric Corp. Electron image device. 4,173,727, Cl. 313-99.000.

Vines, Dorwin J. Vertical wave air compression device. 4,173,432, Cl. 417-231.000.

Vineyard, Billy D.: *See*—
Bachman, Gerald L.; and Vineyard, Billy D., 4,173,562, Cl. 260-112.50R.

Vinko, Michael; and Schmid, Dieter, to Bayerische Motoren Werke Aktiengesellschaft. Installation for the supply of fresh and/or heated air into the interior space of a motor vehicle. 4,173,174, Cl. 98-2.040.

Virtis Company, Inc., The: *See*—
Bird, Harry L.; and Sutherland, David T., 4,173,078, Cl. 34-92.000.

Vistain, James. Cutting tool for metals and plastics. 4,173,070, Cl. 30-241.000.

Vock, Manfred H.: *See*—
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,543, Cl. 252-174.110.
Mussinan, Cynthia J.; Mookherjee, Braja D.; Vock, Manfred H.; Schmitt, Frederick L.; Shuster, Edward J.; Sanders, James M.; Light, Bette M.; and Granda, Edward J., 4,173,711, Cl. 568-665.000.

Voegelin, Heinrich, to Fritz Buser Ag. Maschinenfabrik. Screen printing apparatus. 4,173,185, Cl. 101-120.000.

Vollema, Gerlof: *See*—
Bruins, Antonius H. N. M.; and Vollema, Gerlof, 4,173,652, Cl. 424-324.000.

Volvo Car B.V.: *See*—
Horowitz, Alexandre; van der Hoorn, Rudolf J. G. A.; and Kummeling, Jozef W. M., 4,173,156, Cl. 74-230.17F.

von der Eltz, Hans-Ulrich: *See*—
Birke, Walter; von der Eltz, Hans-Ulrich; and Schon, Franz, 4,173,077, Cl. 34-23.000.

Von Knorring, Knut A., to AB Transporteknik. Parking control system. 4,173,272, Cl. 194-9.00T.

von Musil, Rudolf, to Siemens Aktiengesellschaft. Two part laminated stator for an electric machine with an air-gap winding. 4,173,724, Cl. 310-258.000.

von Reis, Wolf: *See*—
Hentzelt, Walther E.; Nolte, Hans-Henning; and von Reis, Wolf, 4,173,668, Cl. 428-34.000.

Vork, William D., to Graco Inc. Apparatus for mixing liquids. 4,173,418, Cl. 366-128.000.

Vornberger, Walter, to International Shoe Machine Corporation. Pincers assembly and its mounting. 4,173,050, Cl. 12-14.500.

W. H. Brady Co.: *See*—
Tobey, Frederic S., 4,173,507, Cl. 156-443.000.
Tobey, Frederic S., 4,173,510, Cl. 156-584.000.

W. L. Gore & Associates, Inc.: *See*—
Kauffman, Roger S.; and Slothour, Donald L., 4,173,386, Cl. 339-177.00R.

Wada, Moriyasu: *See*—
Suzuki, Shuichi; Wada, Moriyasu; Kajiura, Sadao; and Ito, Takeo, 4,173,592, Cl. 525-134.000.

Wade, Robert C., to Thiokol Corporation. Photosensitive redox solutions. 4,173,521, Cl. 204-157.10R.

Wagner, Kuno: *See*—
Findeisen, Kurt; Wagner, Kuno; and Uerdingen, Walter, 4,173,567, Cl. 548-216.000.

Walker, Connie W.: *See*—
Ulrich, Lawrence W.; and Walker, Connie W., 4,173,105, Cl. 53-374.000.

Walraevens, Rene: *See*—
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,173,710, Cl. 568-614.000.

Ward, Edwin: *See*—
Clatworthy, Gordon K.; and Ward, Edwin, 4,173,413, Cl. 356-145.000.

Warner-Lambert Company: *See*—
Kiraly, Ernest F.; and Motta, Vincent C., 4,173,285, Cl. 206-356.000.

Watanabe, Yasuaki; and Okabe, Yukio, to Victor Company of Japan, Limited. Manual tint control circuit in the color APFC loop mixes two subcarrier oscillator signals. 4,173,770, Cl. 358-28.000.

Waterous Company: *See*—
Thomas, David F.; and Platt, Earl A., 4,173,234, Cl. 137-625.470.

Waters, James M.: *See*—
Grimes, Jerry W.; Schroeder, Stephen M.; and Waters, James M., 4,173,747, Cl. 336-60.000.

Weatherford, William D., Jr.: *See*—
Fodor, George E.; Weatherford, William D., Jr.; and Wright, Bernard R., 4,173,455, Cl. 44-51.000.

Weatherly, Merle H., to Union Carbide Corporation. Coating material and method of applying same for producing wear and corrosion resistant coated articles. 4,173,685, Cl. 428-556.000.

Webb, Grant A.: *See*—
Miller, Donald M.; and Webb, Grant A., 4,173,157, Cl. 74-501.00R.

Weeks, Paul D.: *See*—
Brennan, Thomas M.; Brannegan, Daniel P.; Weeks, Paul D.; and Kuhla, Donald E., 4,173,572, Cl. 260-345.90R.

Wells, Martin A.: *See*—
Rule, Robert B.; Wells, Martin A.; and Dance, John D., 4,173,539, Cl. 252-88.000.

Wells, Vernon W., Jr.: *See*—
Strecker, Lawrence A.; and Wells, Vernon W., Jr., 4,173,557, Cl. 260-31.8DR.

Wells, Willis, to Royal Industries, Inc., a subsidiary of Lear Siegler, Inc. Agricultural furrowing assembly. 4,173,261, Cl. 172-136.000.

Welsh, Jay Y.; and Sochol, Irving, to Chemetals Corporation. Preparation of manganous chloride solution. 4,173,617, Cl. 423-34.000.

Western Electric Company, Incorporated: *See*—
Adams, Charles K., 4,173,736, Cl. 324-51.000.

Westinghouse Electric Corp.: *See*—
Abbondanti, Alberto; and Kernick, Andress, 4,173,779, Cl. 363-27.000.
Anderson, Larry W., 4,173,732, Cl. 318-375.000.
Detering, Richard L., 4,173,722, Cl. 307-252.00Q.
Grimes, Jerry W.; Schroeder, Stephen M.; and Waters, James M., 4,173,747, Cl. 336-60.000.
Halstead, Kenneth G., 4,173,375, Cl. 308-134.100.
Hoffman, Joseph H.; and Thompson, Daniel G., 4,173,429, Cl. 416-184.000.
Hyvarinen, Wayne E.; and Rosell, Lloyd J., 4,173,774, Cl. 361-87.000.
Massaro, Anthony A., Jr.; and Andrews, Harry N., 4,173,060, Cl. 29-157.400.
Meier, Joseph F.; Rudd, George E.; Pradhan, Ashok V.; George, John A.; Lippincott, Hugh W.; and Sutherland, John D., 4,173,512, Cl. 176-37.000.
Mercier, George E., 4,173,776, Cl. 361-272.000.
Obermeyer, Franklin D.; and Berringer, Robert T., 4,173,513, Cl. 176-50.000.
Smith, James D. B.; and Kauffman, Robert N., 4,173,593, Cl. 525-109.000.
Vine, James, 4,173,727, Cl. 313-99.000.
Young, Robert G.; and Morton, Edward W., 4,173,730, Cl. 315-53.000.

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Romano, Emanuele, 4,173,126, Cl. 62-306.000.

Wetzel, Bernd: *See*—
Maier, Roland; Woitun, Eberhard; Reuter, Wolfgang; Wetzel, Bernd; Goeth, Hanns; and Lechner, Uwe, 4,173,647, Cl. 424-283.000.

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Hanson, Robert S.; Kronenberger, Paul E.; and Whistler, Charles C., Jr., 4,173,378, Cl. 312-296.000.

Whitcomb, Carl E., to Oklahoma Agricultural and Mechanical Colleges, The Board of Regents for the. Self-contained solar greenhouse. 4,173,212, Cl. 126-430.000.

White Consolidated Industries, Inc.: *See*—
Hanson, Robert S.; Kronenberger, Paul E.; and Whistler, Charles C., Jr., 4,173,378, Cl. 312-296.000.

White, James M., to International Business Machines Corporation. Solid state image scanning system for producing a binary output. 4,173,772, Cl. 358-213.000.

Whitehead, James S.; and Lawson, Thomas M., to Carrier Corporation. Automatic packing system for refuse vehicle. 4,173,424, Cl. 414-517.000.

Wiegand, James B., to Solar Energy Research Corp. Solar radiation collector and water cooler. 4,173,253, Cl. 165-48.00S.

Wieland, Dieter. Process for introducing a gas, in particular carbon dioxide, into a liquid, particularly a beverage, flowing through a line, and a device for performing the process. 4,173,178, Cl. 99-323.100.

Wiggins Teape Limited: *See*—
Woodward, Antony I., 4,173,480, Cl. 430-536.000.

Wilde, Ralph; and Allbert, Barrie J., to Dunlop Limited. Safety tire and wheel rim assembly. 4,173,243, Cl. 152-158.000.
Wilkinson, David B., to United States of America, Air Force. Intermittent burning jet engine. 4,173,122, Cl. 60-247.000.
Willcox, Kenneth W.; and Bailey, Fay W., to Phillips Petroleum Company. Impact styrene polymer blends with thermoplastic elastomers. 4,173,597, Cl. 525-98.000.
Williams, Robert E., to Exxon Production Research Company. Method for removing suspended oil droplets from water. 4,173,533, Cl. 210-73.00W.
Williams, William R., to United States of America, Energy. Solid handling valve. 4,173,327, Cl. 251-31.000.
Wills, Robert N. Cleaning apparatus. 4,173,053, Cl. 15-71.000.
wilson, James R.: *See*—
Crawford, Wheeler C.; and wilson, James R., 4,173,489, Cl. 106-281.00N.
Wilson, Richard C. Accessory clip and page separator for notepads and the like. 4,173,358, Cl. 281-45.000.
Wilson, Wilfred W., to Gemel Ltd. Collating and packaging machine. 4,173,107, Cl. 53-534.000.
Winter, Gerhard: *See*—
Woditsch, Peter; Winter, Gerhard; Linde, Gunter; and Muller, Friedhelm, 4,173,485, Cl. 106-73.300.
Wirsching, Franz: *See*—
Huller, Rolf; Knauf, Alfons; and Wirsching, Franz, 4,173,610, Cl. 264-28.000.
Wise, Dennis. Variable design torch guide. 4,173,333, Cl. 266-66.000.
Witting, Harald L., to General Electric Company. Pulsed cesium discharge light source. 4,173,728, Cl. 313-163.000.
Woditsch, Peter; Winter, Gerhard; Linde, Gunter; and Muller, Friedhelm, to Bayer Aktiengesellschaft. Production of zinc and alkaline earth metal titanates. 4,173,485, Cl. 106-73.300.
Woitun, Eberhard: *See*—
Maier, Roland; Woitun, Eberhard; Reuter, Wolfgang; Wetzel, Bernd; Goeth, Hanns; and Lechner, Uwe, 4,173,647, Cl. 424-283.000.
Wolf, William E., to Du Pont de Nemours, E. I., and Company. Web inspection system and method therefor. 4,173,441, Cl. 356-431.000.
Woodcock, Sydney H.: *See*—
Yates, Patrick; Woodcock, Sydney H.; and Beals, Jeffrey R., 4,173,169, Cl. 89-132.000.
Woodward, Antony I., to Wiggins Teape Limited. Photographic sheet with synthetic hectorite antistatic additive as sizing or backcoat. 4,173,480, Cl. 430-536.000.
Woycechowsky, Brian J.: *See*—
Millard, Maurice; Peters, David L.; Trzeciak, John R.; and Woycechowsky, Brian J., 4,173,081, Cl. 35-12.00N.
Wright, Bernard R.: *See*—
Fodor, George E.; Weatherford, William D., Jr.; and Wright, Bernard R., 4,173,455, Cl. 44-51.000.
Wright, Stephen: *See*—
Ramsay, Melvin M.; and Wright, Stephen, 4,173,412, Cl. 356-33.000.
Wu, Ching-Yong; Pretzer, Wayne R.; and Kobylinski, Thaddeus P., to Gulf Research and Development Company. Decomposition of cumene hydroperoxide with a heterogeneous catalyst. 4,173,587, Cl. 260-593.00A.
Wunderlich, Klaus: *See*—
Schmitz, Reinold; and Wunderlich, Klaus, 4,173,568, Cl. 260-314.500.
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Enders, Edgar; Ebbighausen, Volker; Gau, Wolfgang; Wunsche, Christian; and Stendel, Wilhelm, 4,173,645, Cl. 424-273.00R.
WWG Industries, Inc.: *See*—
Chambley, Phillip W.; and Norris, Alan H., 4,173,115, Cl. 57-293.000.
Wyatt, Philip J., to Science Spectrum, Inc. Apparatus and process for rapidly characterizing and differentiating large organic cells. 4,173,415, Cl. 356-336.000.
Xerox Corporation: *See*—
Savage, Robert C., 4,173,294, Cl. 222-1.000.
Stewart, Donald E., 4,173,408, Cl. 355-14.00R.
Yagiyu, Seturo: *See*—
Mimura, Akio; Suzuki, Takaya; and Yagiyu, Seturo, 4,173,674, Cl. 428-220.000.
Yamada, Kazuji; Sato, Hideo; Okayama, Tsutomu; Nishihara, Motohisa; Matsuoka, Yoshitaka; Katohgi, Katsuya; Matsuda, Yasumasa; and Shimada, Satoshi, to Hitachi, Ltd. Semiconductor strain gauge with temperature compensator. 4,173,148, Cl. 73-766.000.
Yamada, Kinsaku: *See*—
Takayama, Teruo; Yamada, Kinsaku; and Niida, Chiaki, 4,173,204, Cl. 123-119.00A.
Yamada, Koichi; Hashimoto, Tadanori; and Horinouchi, Kazuo, to Sumitomo Aluminum Smelting Company, Limited. Electrodes for aluminum reduction cells. 4,173,518, Cl. 204-67.000.
Yamaguchi, June: *See*—
Sera, Hidefumi; Ishii, Tsumoru; Yamaguchi, June; and Shiraishi, Hisashi, 4,173,481, Cl. 430-621.000.
Yamai, Fumito: *See*—
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,173,688, Cl. 521-56.000.
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Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; Yamamoto, Toshihiko, deceased; and Yamamoto, Hikotaro, legal representative, 4,173,637, Cl. 424-263.000.
Yamamoto, Toshihiko: *See*—
Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; and Yamamoto, Toshihiko, 4,173,638, Cl. 424-263.000.
Yamamoto, Toshihiko, deceased: *See*—
Nishiyama, Ryuzo; Fujikawa, Kanichi; Nasu, Rikuo; Toki, Tadaaki; Yamamoto, Toshihiko, deceased; and Yamamoto, Hikotaro, legal representative, 4,173,637, Cl. 424-263.000.
Yamanaka, Masami, to Yamato Scale Company, Limited. Gray code reader. 4,173,752, Cl. 340-146.1AG.
Yamato Scale Company, Limited: *See*—
Yamanaka, Masami, 4,173,752, Cl. 340-146.1AG.
Yamazaki, Noboru; and Higashi, Fukuji, to Sumitomo Chemical Company, Limited. Phosphonium salt and its use. 4,173,563, Cl. 260-112.50R.
Yanik, Stephen J.: *See*—
Frayer, James A.; Stauffer, Harry C.; and Yanik, Stephen J., 4,173,528, Cl. 208-210.000.
Yates, Patrick; Woodcock, Sydney H.; and Beals, Jeffrey R. Semi-automatic firearm. 4,173,169, Cl. 89-132.000.
Yevick, George J., to Izon Corporation. Compact optical viewer for microfiche or cassette. 4,173,399, Cl. 353-78.000.
Yokota, Minoru, to Konishiroku Photo Industry Co., Ltd. Copying lens. 4,173,396, Cl. 350-216.000.
Yoshida Kogyo Kabushiki Kaisha: *See*—
Sugimoto, Isao, 4,173,132, Cl. 68-189.000.
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Yoshida, Shigeki: *See*—
Kawagai, Kenji; Yoshida, Shigeki; Ogawa, Hisaharu; and Ohashi, Toshiro, 4,173,756, Cl. 340-636.000.
Yoshida, Tadao, to Sony Corporation. Overload detecting circuit for a PWM amplifier. 4,173,739, Cl. 330-298.000.
Yoshida, Takao; Mookherjee, Braja D.; Kamath, Venkatesh; Hall, John B.; Taylor, William I.; and Schmitt, Frederick J., to International Flavors & Fragrances Inc. 2,2,3-Trimethyl-3-cyclopenten-1-ylalkenyl- and alkylidene-cycloalkanones. 4,173,585, Cl. 260-586.00R.
Young, Robert G.; and Morton, Edward W., to Westinghouse Electric Corp. Compact fluorescent lamp unit having integral circuit means for DC operation. 4,173,730, Cl. 315-53.000.
Yu, Mason K., to American Standard, Inc. Hybrid dual shaft gas turbine with accumulator. 4,173,121, Cl. 60-39.16R.
Zann, Annie: *See*—
Beguin, Alain; Dubois, Jean-Claude; and Zann, Annie, 4,173,545, Cl. 252-299.000.
Zathy, Steve. Miles to kilometers speed and distance indicators converter. 4,173,147, Cl. 73-532.000.
Zell, Dale R., to AMP Incorporated. Snap-on pin header. 4,173,387, Cl. 339-196.00M.
Zell, Michael N.: *See*—
Beuch, Wallace E.; and Zell, Michael N., 4,173,427, Cl. 414-751.000.
Zenda, Richard J.: *See*—
Malacheski, Joseph J.; and Zenda, Richard J., 4,173,292, Cl. 220-303.000.
Zenith Radio Corporation: *See*—
Skerlos, Peter C.; and Smirl, Richard A., 4,173,737, Cl. 325-418.000.
Zephyr Industries, Inc.: *See*—
Richilano, Vincent J., 4,173,343, Cl. 273-169.000.
Zima, Jiri: *See*—
Stoy, Vladimir; Stoy, Artur; Zima, Jiri; and Kalal, Jaroslav, 4,173,606, Cl. 264-1.000.
Zimmerman, Edwin H. Unscrambling apparatus for bar material, including lumber. 4,173,277, Cl. 198-443.000.

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 6TH DAY OF NOVEMBER, 1979

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Andrew, William E., to Imperial Chemical Industries Limited. Vinyl chloride polymerization process. T988,009, 11-6-79, Cl. 526-345.000.

Cunningham, Theresa L.; and Hunt, Clifford E., to Mobil Oil Corporation. Process for preparing C_1–C_5 alkyl 5-(substituted-phenoxy)-2-nitrobenzoate. T988,010, 11-6-79, Cl. 560-21.000.

Dreissen, Hubert H. Process for recovering lead from discarded batteries. T988,003, 11-6-79, Cl. 209-211.000.

Drew, Roland F.; Schmidt, Frank J., Jr.; and Vanduynhoven, Thomas J., to International Business Machines Corporation. Laser deposition of metal upon transparent materials. T988,007, 11-6-79, Cl. 427-53.100.

Falanga, Anthony J.: *See*—
Patterson, N. Donald; Falanga, Anthony J.; Johnston, Edward J.; and Scarnato, Thomas J., T988,005, Cl. 406-30.000.

Gebauer, Gerhard: *See*—
Mayer, Franz; and Gebauer, Gerhard, T988,008, Cl. 525-537.000.

Hunt, Clifford E.: *See*—
Cunningham, Theresa L.; and Hunt, Clifford E., T988,010, Cl. 560-21.000.

Imperial Chemical Industries Limited: *See*—
Andrew, William E., T988,009, Cl. 526-345.000.

International Business Machines Corporation: *See*—
Drew, Roland F.; Schmidt, Frank J., Jr.; and Vanduynhoven, Thomas J., T988,007, Cl. 427-53.100.

International Harvester Company: *See*—
Patterson, N. Donald; Falanga, Anthony J.; Johnston, Edward J.; and Scarnato, Thomas J., T988,005, Cl. 406-30.000.

Johnston, Edward J.: *See*—
Patterson, N. Donald; Falanga, Anthony J.; Johnston, Edward J.; and Scarnato, Thomas J., T988,005, Cl. 406-30.000.

Mayer, Franz; and Gebauer, Gerhard. Coating agents comprising fluoroterpolymers and polyarylene sulfide resins. T988,008, 11-6-79, Cl. 525-537.000.

McClellan, Guerry H.: *See*—
Phillips, John F., Jr.; McClellan, Guerry H.; and McCullough, John F., T988,006, Cl. 423-167.000.

McCullough, John F.: *See*—
Phillips, John F., Jr.; McClellan, Guerry H.; and McCullough, John F., T988,006, Cl. 423-167.000.

Minolta Camera Kabushiki Kaisha: *See*—
Ohta, Kazuo, T988,002, Cl. 118-719.000.

Mobil Oil Corporation: *See*—
Cunningham, Theresa L.; and Hunt, Clifford E., T988,010, Cl. 560-21.000.

Nations, Ronald G. Method of analyzing data. T988,004, 11-6-79, Cl. 364-554.000.

Ohta, Kazuo, to Minolta Camera Kabushiki Kaisha. Apparatus for forming a vacuum evaporating layer on a substrate. T988,002, 11-6-79, Cl. 118-719.000.

Patterson, N. Donald; Falanga, Anthony J.; Johnston, Edward J.; and Scarnato, Thomas J., to International Harvester Company. Automatic feed control system. T988,005, 11-6-79, Cl. 406-30.000.

Phillips, John F., Jr.; McClellan, Guerry H.; and McCullough, John F., to Tennessee Valley Authority. Chemical beneficiation of phosphatic limestone and phosphate rock with α-hydroxysulfonic acids. T988,006, 11-6-79, Cl. 423-167.000.

Scarnato, Thomas J.: *See*—
Patterson, N. Donald; Falanga, Anthony J.; Johnston, Edward J.; and Scarnato, Thomas J., T988,005, Cl. 406-30.000.

Schmidt, Frank J., Jr.: *See*—
Drew, Roland F.; Schmidt, Frank J., Jr.; and Vanduynhoven, Thomas J., T988,007, Cl. 427-53.100.

Smith, Lowrey A., to United States of America, Agriculture. Differential action extractor comb. T988,001, 11-6-79, Cl. 19-203.000.

Tennessee Valley Authority: *See*—
Phillips, John F., Jr.; McClellan, Guerry H.; and McCullough, John F., T988,006, Cl. 423-167.000.

United States of America
Agriculture: *See*—
Smith, Lowrey A., T988,001, Cl. 19-203.000.

Vanduynhoven, Thomas J.: *See*—
Drew, Roland F.; Schmidt, Frank J., Jr.; and Vanduynhoven, Thomas J., T988,007, Cl. 427-53.100.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF NOVEMBER, 1979

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

B. F. Goodrich Co., The: *See*—
Messerly, James W., Re. 30,137, Cl. 152-357.00R.

Compagnie Francaise d'Etudes et de Construction Technip: *See*—
Grenier, Maurice; and Petit, Pierre, Re. 30,140, Cl. 62-28.000.

Cowen, Arthur T., III. Combined carrying bag and racket carrier. Re. 30,138, Cl. 190-52.000.

Ernst Leitz Wetzlar GmbH: *See*—
Kaes, Hans-Herbert, Re. 30,141, Cl. 106-54.000.

Fitzwater, Amelia, executrix: *See*—
Fitzwater, John H., deceased; and Fitzwater, Amelia, executrix, Re. 30,135, Cl. 74-2.000.

Fitzwater, John H., deceased; and by Fitzwater, Amelia, executrix. Electric fail-safe actuator. Re. 30,135, Cl. 74-2.000.

Grenier, Maurice; and Petit, Pierre, to Compagnie Francaise d'Etudes et de Construction Technip. Method for cooling a gaseous mixture to a low temperature. Re. 30,140, Cl. 62-28.000.

Jones, H. Jack, to Jones, Wilma Catherine. Sidearm holsters. Re. 30,139, Cl. 224-243.000.

Jones, Wilma Catherine: *See*—
Jones, H. Jack, Re. 30,139, Cl. 224-243.000.

Kaes, Hans-Herbert, to Ernst Leitz Wetzlar GmbH. Inorganic vitreous detector material. Re. 30,141, Cl. 106-54.000.

LeSuer, William M., to Lubrizol Corporation, The. Phosphorus, nitrogen and sulfo-containing additives. Re. 30,142, Cl. 252-46.700.

Lubrizol Corporation, The: *See*—
LeSuer, William M., Re. 30,142, Cl. 252-46.700.

Messerly, James W., to B. F. Goodrich Co., The. High-modulus rubber composition for pneumatic tires. Re. 30,137, Cl. 152-357.00R.

Petit, Pierre: *See*—
Grenier, Maurice; and Petit, Pierre, Re. 30,140, Cl. 62-28.000.

Schriefer, Arno H., Jr. Solar panel. Re. 30,136, Cl. 126-441.000.

LIST OF PLANT PATENTEES

City of Dallas: *See*—
Huey, G. Philip, 4,475, Cl. 88.000.

Huey, G. Philip, to City of Dallas. *Acalypha wilkesiana* Dallas'. 4,475, 11-6-79, Cl. 88.000.

Moore, Ralph S. Miniature rose plant. 4,479, 11-6-79, Cl. 9.000.

Pan-American Plant Company: *See*—
Petusky, Kerry S., 4,476, Cl. 78.000.
Petusky, Kerry S., 4,477, Cl. 78.000.
Petusky, Kerry S., 4,478, Cl. 77.000.

Petusky, Kerry S., to Pan-American Plant Company. Chrysanthemum named Sunburst Spirit. 4,476, 11-6-79, Cl. 78.000.

Petusky, Kerry S., to Pan-American Plant Company. Chrysanthemum named Hartmann's Yellow Dignity. 4,477, 11-6-79, Cl. 78.000.

Petusky, Kerry S., to Pan-American Plant Company. Chrysanthemum named Ruffled Spirit. 4,478, 11-6-79, Cl. 77.000.

LIST OF DESIGN PATENTEES

AB Kalle-Regulatorer: *See*—
Nyberg, Gustav B., 253,365, Cl. D23-19.000.

Adams, Kenneth D.: *See*—
Genaro, Donald M.; Felix, Cristian J.; Herron, William L.; and Adams, Kenneth D., 253,346, Cl. D15-69.000.

Adams, Ronald J. Strap retainer. 253,320, 11-6-79, Cl. D2-447.000.

Allied Energy Corp.: *See*—
Schrank, Jerome, 253,371, Cl. D23-127.000.

Andreas Hofmann Metallwarenfabrik, Firma: *See*—
Blatzer, Thea; Ender, Willfried; and Ketnath, Gerhard, 253,323, Cl. D6-25.000.

Appel, Mel. Toy airplane. 253,358, 11-6-79, Cl. D21-87.000.

Bardeau, William M. Steam self contained kettle. 253,348, 11-6-79, Cl. D15-104.000.

Baron, William J.: *See*—
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Barta, John J., Jr. Solid state protector for communications circuits or similar article. 253,341, 11-6-79, Cl. D13-11.000.

Bass, Saul; and Goodman, Arthur J. Dispensing container for liquids or the like. 253,337, 11-6-79, Cl. D9-139.000.

Bell Telephone Laboratories, Incorporated: *See*—
Genaro, Donald M.; McGarvey, John N.; and Sylvester, Gordon E., 253,344, Cl. D14-60.000.

Blatzer, Thea; Ender, Willfried; and Ketnath, Gerhard, to Andreas Hofmann Metallwarenfabrik, Firma. Support stand for a loudspeaker. 253,323, 11-6-79, Cl. D6-25.000.

Bonk, Joseph P., to Kendall Company, The. Lubricant device. 253,374, 11-6-79, Cl. D24-63.000.

Brukoff, Barry. Sofa. 253,326, 11-6-79, Cl. D6-61.000.

Camilo Muebles, Inc.: *See*—
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Carr, Carolyn M.: *See*—
Carr, Paul S., III; and Carr, Carolyn M., 253,333, Cl. D7-96.000.

Carr, Paul S., III; and Carr, Carolyn M. Baking pan. 253,333, 11-6-79, Cl. D7-96.000.

Celeste, Victor, to 369403 Ontario Limited. Foot massage roller. 253,373, 11-6-79, Cl. D24-36.000.

Chalmers, Thomas R. Stove. 253,370, 11-6-79, Cl. D23-97.000.

Chen, Evan N., to Warner-Lambert Company. Safety razor cartridge with clean-out mechanism. 253,375, 11-6-79, Cl. D28-47.000.

Cloyd, Goldie M. Statuette. 253,339, 11-6-79, Cl. D11-157.000.

Continental Group, Inc., The: *See*—
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Dieter, Berthold B.; and Gibson, Charles L., 253,363, Cl. D21-244.000.

Dassler, Armin A. Sole for footwear. 253,319, 11-6-79, Cl. D2-320.000.

DeWindt, Farrell. Push bar for doors or the like. 253,336, 11-6-79, Cl. D8-404.000.

Dieter, Berthold B.; and Gibson, Charles L., to Creative Playgrounds Corporation. Playground structure. 253,362, 11-6-79, Cl. D21-243.000.

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Ender, Willfried: *See*—
Blatzer, Thea; Ender, Willfried; and Ketnath, Gerhard, 253,323, Cl. D6-25.000.

Felix, Cristian J., to Singer Company, The. Sewing machine. 253,347, 11-6-79, Cl. D15-70.000.

Felix, Cristian J.: *See*—
Genaro, Donald M.; Felix, Cristian J.; Herron, William L.; and Adams, Kenneth D., 253,346, Cl. D15-69.000.

Ferch, Rudolf, to Kastle Gesellschaft m.b.H. Ski. 253,361, 11-6-79, Cl. D21-229.000.

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Friedrich, Robert E. Figurine. 253,340, 11-6-79, Cl. D11-160.000.

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Gauntner, Isabell L.: *See*—
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Genaro, Donald M.; McGarvey, John N.; and Sylvester, Gordon E., to Bell Telephone Laboratories, Incorporated. Telephone stand. 253,344, 11-6-79, Cl. D14-60.000.

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Gibson, Charles L.: *See*—
Dieter, Berthold B.; and Gibson, Charles L., 253,362, Cl. D21-243.000.
Dieter, Berthold B.; and Gibson, Charles L., 253,363, Cl. D21-244.000.

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Hull, L. Perry. Fabric shoe. 253,316, 11-6-79, Cl. D2-273.000.

Hunter, Alexander: *See*—
Schultz, Loren A.; and Hunter, Alexander, 253,343, Cl. D14-40.000.

Husqvarna AB: *See*—
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Rosenblad, Lars G., 253,356, Cl. D18-24.000.
Rosenblad, Lars G., 253,357, Cl. D18-24.000.

International Business Machines Corporation: *See*—
Lenney, Edwin J.; and Schaefer, John O., 253,354, Cl. D18-12.000.

International Silver Company: *See*—
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Jennings, Ralph L., to Economy Forms Corporation. Liner for spent nuclear fuel pools. 253,349, 11-6-79, Cl. D15-136.000.

Johansson, Hans A. V. Bathtub. 253,368, 11-6-79, Cl. D23-55.000.

Johnson, Jerry L. Cabinet. 253,327, 11-6-79, Cl. D6-168.000.

Jolliffe, John E., to SCM Corporation. Typewriter. 253,353, 11-6-79, Cl. D18-1.000.

Kaman, Charles H. Guitar. 253,350, 11-6-79, Cl. D17-19.000.

Kaman, Charles H. Guitar soundboard. 253,352, 11-6-79, Cl. D17-20.000.

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Ferch, Rudolf, 253,361, Cl. D21-229.000.

Kendall Company, The: *See*—
Bonk, Joseph P., 253,374, Cl. D24-63.000.

Ketnath, Gerhard: *See*—
Blatzer, Thea; Ender, Willfried; and Ketnath, Gerhard, 253,323, Cl. D6-25.000.

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Lenney, Edwin J.; and Schaefer, John O., to International Business Machines Corporation. Cartridge for a typewriter. 253,354, 11-6-79, Cl. D18-12.000.

Lopez, Camilo, III, to Camilo Muebles, Inc. Seat. 253,324, 11-6-79, Cl. D6-47.000.

Lutron Electronics Co., Inc.: *See*—
Mayo, Noel, 253,342, Cl. D13-32.000.

Maccario, Michael. Shoe heel protector. 253,318, 11-6-79, Cl. D2-314.000.

Mayclin, Thomas J. Dental mixing slab. 253,372, 11-6-79, Cl. D24-10.000.

Mayo, Noel, to Lutron Electronics Co., Inc. Remote dimming control system. 253,342, 11-6-79, Cl. D13-32.000.
McFadden, William J., to Senninger Irrigation, Inc. Sprinkler head. 253,364, 11-6-79, Cl. D23-6.000.
McGarvey, John N.: *See*—
Genaro, Donald M.; McGarvey, John N.; and Sylvester, Gordon E., 253,344, Cl. D14-60.000.
Nagel, Dietmar; and Baron, William J., to Nagel-Kennedy Associates. Doll. 253,360, 11-6-79, Cl. D21-166.000.
Nagel-Kennedy Associates: *See*—
Nagel, Dietmar; and Baron, William J., 253,360, Cl. D21-166.000.
Negrin, Rino, to Sports Enterprises, Inc. Shoe. 253,317, 11-6-79, Cl. D2-272.000.
Northern Telecom Limited: *See*—
Read, Clifford D.; Hillmer, Robert E.; and Tyson, John F., 253,345, Cl. D14-60.000.
Nyberg, Gustav B., to AB Kalle-Regulatorer. Ball valve. 253,365, 11-6-79, Cl. D23-19.000.
Olschewski, Hans J., to FKF Fleischwaren- und Konserven-Fabrik, Schultz & Berndt GmbH & Co. KG. Food container. 253,331, 11-6-79, Cl. D7-76.000.
Ovation Instruments, Inc.: *See*—
Rickard, James H., 253,351, Cl. D17-20.000.
Ranucci, Alberto: *See*—
Gasser, George E.; and Ranucci, Alberto, 253,325, Cl. D6-56.000.
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Rosenblad, Lars G., to Husqvarna AB. Monogram font. 253,355, 11-6-79, Cl. D18-24.000.
Rosenblad, Lars G., to Husqvarna AB. Monogram. 253,356, 11-6-79, Cl. D18-24.000.
Rosenblad, Lars G., to Husqvarna AB. Monogram. 253,357, 11-6-79, Cl. D18-24.000.
Saute, Robert E. Head for a hair brush. 253,321, 11-6-79, Cl. D4-35.000.
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Schaefer, John O.: *See*—
Lenney, Edwin J.; and Schaefer, John O., 253,354, Cl. D18-12.000.
Schrank, Jerome, to Allied Energy Corp. Vaporizer for a combustion system. 253,371, 11-6-79, Cl. D23-127.000.
Schultz, Loren A.; and Hunter, Alexander, to Transaction Management, Inc. Cartridge drive. 253,343, 11-6-79, Cl. D14-40.000.
SCM Corporation: *See*—
Jolliffe, John E., 253,353, Cl. D18-1.000.
Senninger Irrigation, Inc.: *See*—
McFadden, William J., 253,364, Cl. D23-6.000.
Shilin, Alec A.: *See*—
Gauntner, Ralph J.; and Shilin, Alec A., 253,335, Cl. D8-402.000.
Singer Company, The: *See*—
Felix, Cristian J., 253,347, Cl. D15-70.000.
Genaro, Donald M.; Felix, Cristian J.; Herron, William L.; and Adams, Kenneth D., 253,346, Cl. D15-69.000.
Sports Enterprises, Inc.: *See*—
Negrin, Rino, 253,317, Cl. D2-272.000.
Staehli, Paul: *See*—
Koelble, Alexander; and Staehli, Paul, 253,369, Cl. D23-69.000.
Sylvester, Gordon E.: *See*—
Genaro, Donald M.; McGarvey, John N.; and Sylvester, Gordon E., 253,344, Cl. D14-60.000.
Thompson, James S. Rug. 253,328, 11-6-79, Cl. D6-210.000.
Transaction Management, Inc.: *See*—
Schultz, Loren A.; and Hunter, Alexander, 253,343, Cl. D14-40.000.
Tyson, John F.: *See*—
Read, Clifford D.; Hillmer, Robert E.; and Tyson, John F., 253,345, Cl. D14-60.000.
Walker, E. Dean. Action doll. 253,359, 11-6-79, Cl. D21-150.000.
Warner-Lambert Company: *See*—
Chen, Evan N., 253,375, Cl. D28-47.000.
Weaver, Albert R. Bathtub. 253,366, 11-6-79, Cl. D23-55.000.
Weaver, Albert R. Bathtub. 253,367, 11-6-79, Cl. D23-55.000.
Weaver, Earl W. Lunch pail or similar article. 253,330, 11-6-79, Cl. D7-76.000.
369403 Ontario Limited: *See*—
Celeste, Victor, 253,373, Cl. D24-36.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 6, 1979

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

197	4,173,042

CLASS 4

172.12	4,173,043
325	4,173,044

CLASS 5

12 R	4,173,045
260	4,173,047
436	4,173,048
451	4,173,049
484	4,173,046

CLASS 8

1 XB	4,173,452
10.1	4,173,453

CLASS 12

14.5	4,173,050

CLASS 15

3.12	4,173,051
71	4,173,053
83	4,173,052
98	4,173,054
250.02	4,173,055
320	4,173,056

CLASS 19

159 R	4,173,057

CLASS 29

148.4 D	4,173,058
157.4	4,173,060
240	4,173,059
403.2	4,173,061
570	4,173,062
571	4,173,063
578	4,173,064
603	4,173,065
623.1	4,173,066
749	4,173,067

CLASS 30

161	4,173,068
228	4,173,069
241	4,173,070
339	4,173,071

CLASS 33

1 Q	4,173,073
2 R	4,173,074
23 K	4,173,075
27 B	4,173,076

CLASS 34

23	4,173,077
92	4,173,078
217	4,173,079

CLASS 35

10.25	4,173,080
12 N	4,173,081
37	4,173,082

CLASS 36

59 R	4,173,083
121	4,173,084

CLASS 40

433	4,173,085
518	4,173,087
607	4,173,086

CLASS 42

58	4,173,088
	4,173,089
67	4,173,090

CLASS 43

43.12	4,173,091
61	4,173,092
121	4,173,093
129	4,173,094

CLASS 44

1 SR	4,173,454
51	4,173,455
62	4,173,456

CLASS 46

201	4,173,095
205	4,173,096

CLASS 47

66	4,173,097
80	4,173,098

CLASS 49

168	4,173,099

CLASS 51

227 H	4,173,100
309	4,173,457

CLASS 52

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73	4,173,102
79.13	4,173,103

CLASS 53

201	4,173,104
374	4,173,105
449	4,173,106
534	4,173,107
587	4,173,108

CLASS 54

24	4,173,109

CLASS 55

405	4,173,458

CLASS 56

10.2	4,173,110
202	4,173,111
341	4,173,112

CLASS 57

249	4,173,113
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85.5	4,173,117

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39.16 R	4,173,119
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39.65	4,173,118
247	4,173,122
641	4,173,123
667	4,173,124

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306	4,173,126
374	4,173,127

CLASS 64

1 S	4,173,128
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23	4,173,130

CLASS 65

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40	4,173,460
106	4,173,461

CLASS 66

192	4,173,131

CLASS 68

189	4,173,132

CLASS 71

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87	4,173,463
118	4,173,464

CLASS 72

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10	4,173,134
21	4,173,135
58	4,173,136
320	4,173,137
349	4,173,138

CLASS 73

1 DV	4,173,139
35	4,173,140
40.7	4,173,141
60	4,173,142
194 VS	4,173,143
229	4,173,144
422 GC	4,173,145
462	4,173,146
532	4,173,147
706	4,173,149
714	4,173,150
766	4,173,148

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190	4,173,152
197	4,173,153
217 B	4,173,154
230.17 F	4,173,156
230.17 M	4,173,155
501 R	4,173,157
574	4,173,158

CLASS 75

35	4,173,465
58	4,173,466
119	4,173,467
134 N	4,173,468
168 F	4,173,469
237	4,173,471

CLASS 82

1 C	4,173,159

CLASS 83

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278	4,173,161
617	4,173,162

CLASS 84

1.01	4,173,163
1.19	4,173,164
311	4,173,165
343	4,173,166
345	4,173,167
470 R	4,173,168

CLASS 89

132	4,173,169
188	4,173,170

CLASS 91

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369 A	4,173,172

CLASS 93

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CLASS 98

2.04	4,173,174
41 SV	4,173,175
115 VM	4,173,176

CLASS 99

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374	4,173,179
391	4,173,180
618	4,173,177

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CLASS 101

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111	4,173,183
	4,173,184
120	4,173,185

CLASS 102

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105	4,173,187

CLASS 106

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54	Re.30,141
73.3	4,173,485
99	4,173,486
103	4,173,487
213	4,173,488
281 N	4,173,489
287.14	4,173,490
288 B	4,173,491
308 F	4,173,492

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243	4,173,190

CLASS 112

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79 R	4,173,192
275	4,173,193

CLASS 114

218	4,173,194
244	4,173,195
253	4,173,196

CLASS 116

223	4,173,197

CLASS 118

212	4,173,199
706	4,173,198

CLASS 119

23	4,173,200
106	4,173,201

CLASS 123

48 B	4,173,202
119 A	4,173,203
	4,173,204
	4,173,205
119 E	4,173,206
136	4,173,207
139 AT	4,173,208
198 F	4,173,209

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35 A	4,173,210
45	4,173,211

CLASS 126

369	4,173,215
425	4,173,213
430	4,173,212
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	4,173,214

CLASS 128

24.1	4,173,216
77	4,173,218
142.7	4,173,220
214 C	4,173,222
	4,173,223
214 E	4,173,224
218 C	4,173,225
233	4,173,226
235	4,173,227
260	4,173,219
419 PG	4,173,230
419 R	4,173,229
653	4,173,228
696	4,173,221
734	4,173,217

CLASS 132

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CLASS 133

3 R	4,173,232

CLASS 134

11	4,173,493

CLASS 136

89 MS	4,173,496
89 PC	4,173,495
89 SJ	4,173,497
89 TF	4,173,494
217	4,173,498

CLASS 137

102	4,173,233
625.47	4,173,234

CLASS 140

82	4,173,235

CLASS 141

249	4,173,236

CLASS 144

3 K	4,173,237
311	4,173,239
312	4,173,238
	4,173,240

CLASS 148

9 R	4,173,499
16	4,173,500
16.5	4,173,501
113	4,173,502

CLASS 150

1.5 R	4,173,241
38	4,173,242

CLASS 152

158	4,173,243
218	4,173,244
357 R	Re.30,137

CLASS 156

123 R	4,173,503
180	4,173,504
285	4,173,505
309	4,173,506
443	4,173,507
499	4,173,508
507	4,173,509
584	4,173,510

CLASS 157

1.24	4,173,245

CLASS 159

6 W	4,173,246

CLASS 160

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CLASS 162

141	4,173,248
350 R	4,173,249

CLASS 164

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436	4,173,251

CLASS 165

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48 S	4,173,253
134 R	4,173,254

CLASS 166

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324	4,173,256

CLASS 171

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CLASS 172

4.5	4,173,258
10	4,173,259
59	4,173,260
136	4,173,261
599	4,173,262

CLASS 174

35 R	4,173,712

CLASS 176

36 R	4,173,511
37	4,173,512
50	4,173,513

CLASS 177

210 EM	4,173,263

CLASS 179

18 EA	4,173,713
99 R	4,173,714
156 R	4,173,715

CLASS 180

68.5	4,173,264
79.1	4,173,265

CLASS 181

156	4,173,266
199	4,173,267

CLASS 187

8.49	4,173,268

CLASS 188

71.5	4,173,269

CLASS 190

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CLASS 192

3.29	4,173,270

CLASS 194

4 C	4,173,271
9 T	4,173,272

CLASS 198

367	4,173,274
421	4,173,275
437	4,173,276
443	4,173,277
461	4,173,278
500	4,173,279
812	4,173,280

CLASS 204

59 QM	4,173,517
67	4,173,518
110	4,173,519
113	4,173,520
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192 C	4,173,522
197	4,173,523
265	4,173,524
275	4,173,525
296	4,173,526

CLASS 206

5.1	4,173,281
216	4,173,282
338	4,173,283
349	4,173,284
356	4,173,285
433	4,173,286

CLASS 208

153	4,173,527
210	4,173,528
255	4,173,529

CLASS 209

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CLASS 210

5	4,173,531
49	4,173,532
73 W	4,173,533
195.3	4,173,534
225	4,173,535
242 S	4,173,536
321 B	4,173,537

CLASS 217

65	4,173,287

CLASS 219

10.55 F	4,173,716

CLASS 220

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7	4,173,289
75	4,173,290
225	4,173,291
303	4,173,292

CLASS 221

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CLASS 222

	4,173,294
81	4,173,295
129.1	4,173,296
321	4,173,297
368	4,173,298
594	4,173,299

CLASS 223

70	4,173,300

CLASS 224

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CLASS 226

102	4,173,301

CLASS 228

219	4,173,302

CLASS 233

24	4,173,303

CLASS 237

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CLASS 239

79	4,173,305
230	4,173,306
265.29	4,173,307
383	4,173,308
542	4,173,309

CLASS 241

282.1	4,173,310

CLASS 242

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7.11 4,173,312
56.2 4,173,313
58.4 4,173,314
74 4,173,315
84.2 R 4,173,316
84.21 R 4,173,317
107.4 A 4,173,318
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259 4,173,718
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445 T 4,173,720

CLASS 251

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49.6 4,173,540
52 R 4,173,541
78.1 4,173,542
88 4,173,539
174.11 4,173,543
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301.1 W 4,173,546
429 B 4,173,547
430 4,173,548
463 4,173,549
522 4,173,550

CLASS 254

93 R 4,173,329
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105 4,173,331
160 4,173,332

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23.7 M 4,173,552
29.2 EP 4,173,554
29.2 M 4,173,553
29.7 H 4,173,555
30.8 R 4,173,556
31.8 DR 4,173,557
33.4 R 4,173,558
4,173,559
37 SB 4,173,560
45.75 B 4,173,561
112.5 R 4,173,562
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4,173,564
191 4,173,565
239 A 4,173,566
314.5 4,173,568
326.43 4,173,569
340.9 R 4,173,570
343.41 4,173,571
345.9 R 4,173,572
346.4 4,173,573
399 4,173,574
429 R 4,173,575
448.8 R 4,173,576
500.5 H 4,173,577
502.4 R 4,173,578
513 T 4,173,579
543 R 4,173,580
552 SC 4,173,581
553 R 4,173,582
559 S 4,173,583
586 R 4,173,584
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593 A 4,173,587
595 4,173,588
604 HF 4,173,589
606.5 P 4,173,590
646 4,173,591
938 4,173,601
971 4,173,602
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109 4,173,605

CLASS 264

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26 4,173,608
28 4,173,610
43 4,173,609
138 4,173,611
176 R 4,173,612
187 4,173,613
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85 B 4,173,338
95 A 4,173,340
95 R 4,173,339
126 A 4,173,341
148 R 4,173,342
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183 B 4,173,344
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CLASS 277

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40 4,173,350

CLASS 280

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605 4,173,354
642 4,173,355
743 4,173,356
808 4,173,357

CLASS 281

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CLASS 285

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110 4,173,362
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CLASS 292

256.67 4,173,364

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67 E 4,173,334
83 R 4,173,366
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137 R 4,173,371

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CLASS 310

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CLASS 312

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330 SM 4,173,379

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CLASS 315

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CLASS 318

375 4,173,732

CLASS 320

48 4,173,733

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8 4,173,734

CLASS 324

51 4,173,736
421 4,173,735

CLASS 325

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CLASS 330

4.3 4,173,738
298 4,173,739
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CLASS 331

111 4,173,741

CLASS 333

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135 4,173,771
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CLASS 360

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